

JPRS-UMA-86-059

5 NOVEMBER 1986

# USSR Report

MILITARY AFFAIRS

AVIATION AND COSMONAUTICS

No 7, JULY 1986

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5 NOVEMBER 1986

# USSR REPORT MILITARY AFFAIRS

## AVIATION AND COSMONAUTICS

No 7, July 1986

Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.

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# GENERAL BATEKHIN URGES BETTER PARTY IDEOLOGICAL EFFORTS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 1-3

[Article by Col Gen Avn L. Batekhin, Military Council member, chief of the Air Force Political Directorate, delegate to the 27th CPSU Congress: "Ideological Work to the Level of the Party's Demands"]

[Text] Soviet citizens are working enthusiastically on implementing the program to speed up our country's socioeconomic development, a program approved by the 27th CPSU Congress. The energy of plan and concept is being transformed into the energy of concrete actions. An irreversible process of renewal and radical transformations is taking place in each and every Air Force military collective and workforce. And this process is taking place via people's minds and hearts, requiring a total effort from each and every one of us.

Implementing the tasks proceeding from the congress decisions, military aviation personnel are working persistently to increase vigilance, to strengthen discipline and combat readiness. Analysis of the results of the winter period of training and progress in summer combat training indicates that most Air Force units and subunits have firmly set and for the most part are maintaining a direction aimed at complete, high-quality accomplishment of combat and political training plans and schedules. Commanders, staffs, political agencies and party organizations are placing emphasis in the training and indoctrination process on further improving the level of professional skill of flight and engineer-technician personnel, communications and Air Force rear services specialist personnel, bringing training as close as possible to the conditions of actual combat.

Greater realism and firmness in assessing the attained level of combat readiness, air, weapons and tactical proficiency, discipline, and flight safety have become a characteristic feature of the initiated reorganization of the work style and methods of Air Force command-political leader cadres. A trend toward objective determination of actual growth in military skill, effectiveness of command and control, as well as other major components of combat readiness and, in case of worsening of these indices, identification and correction of the causes of deficiencies, is being manifested increasingly more distinctly.

Nevertheless, in spite of certain positive changes in the psychology, mood, and attitude of the majority of military aviation personnel toward their military and party duty, it is at present a bit premature to claim that a radical turning point has been reached. Therefore today all of us, and Air Force ideological workers in particular, must appraise our activities in a frank and party-minded manner, concentrating at all levels and echelons maximum attention and efforts toward practical organization of things. "We shall be unable to advance a single step," it was stressed in the Central Committee Political Report to the 27th CPSU Congress, "if we do not learn to work in a new way, if we are unable to overcome sluggishness and conservatism in all of their manifestations, if we lose the courage soberly to assess the situation and to see it as it in fact is."

The multifaceted tasks of the strategy of acceleration, including in military organizational development, and the complex processes taking place in the Air Force under the influence of scientific and technological advance require comprehensive ideological support. These processes are of the nature of large-scale, constructive changes directed toward qualitative renewal in the Air Force. Technical reequipping of aviation subunits and transition-training of personnel over to modern combat equipment is continuing. Naturally operational art, tactics and tactical control, rear services, electronic and other types of flight operations support are being improved, as is the system of training command-political, flight and engineer-technician cadres.

Carrying out the party's policy directed toward comprehensive activation of the human factor, commanders, staffs, political agencies and party organizations are displaying constant concern with intensifying the training process, especially training of flight personnel. In particular, the point is to increase the effectiveness of utilization of available aircraft and flying time severalfold by better organization and advanced methods, reducing unproductive expenditures of flying time, and increasing time for scheduled commander training. And many such major changes are planned within the Air Force. Their end results depend in large measure on conscious, active participation by all aviation personnel in accomplishing the tasks of today and beyond.

What is the most important thing in the area of ideological activity? One can best reply to this question in the words of V. I. Lenin: "The main element in the content of ideology is inculcation of party policy into the consciousness of the masses." Ideological indoctrination work is a component part of CPSU policy and is not simply a normal sphere of activity but a most important instrument for accomplishing the principal tasks facing our country and its Armed Forces.

After the June (1983) CPSU Central Committee Plenum there was without question an appreciable increase in attention by Air Force command personnel and political workers toward the ideological area, organization, ideological content and methods of political training, political, military, and moral indoctrination, and toward the practical adoption of active forms and methods of influencing people's minds and hearts. A system of counterpropaganda, for example, was formed during that time and has been operating fairly well, and

matters pertaining to political briefing of Air Force personnel began to be handled better. These and other positive changes attest to a definite qualitative growth in the principal areas of our ideological activity. But in no way do they entitle us to rest on our laurels.

The 27th CPSU Congress showed how root problems of the present day should be examined and resolved with Leninist straightforwardness and party firmness, in a businesslike manner. Applying this methodology to an appraisal of the present state of ideological indoctrination work in the Air Force and the effectiveness of its influence on combat training, flight safety, discipline and organization of personnel, important lessons must be drawn -- first and foremost, the lesson of truth. One should not sidestep the fact that the state of ideological work in some units and subunits does not presently meet the high demands of the party and the spirit of the times. The point is its effectiveness, determined by the correlation of stated goals, expended resources, and achieved results. What is the reason for this?

I believe it lies first and foremost in people and their inability to think and work in the new way. Practical realities have sharply addressed the question of extensive movement of ideological work toward specific, practical needs. A more precise, flexible response to changes which are taking place and to new phenomena is required today of leader-Communists and ideological activists. We must resolutely free ourselves of boring didacticism and isolation of agitation-propaganda and other measures from a practical foundation and the call of the times. Evidently not everybody has proven ready and willing to depart from the well-trodden road of obsolete views and work forms and to reorganize quickly to an efficient operation.

In the Air Force unit in which officer G. Batin serves as political worker, for example, a group of aircrews was taking part in a tactical air exercise involving weapons delivery. Performance results at the range proved below expectations. As an analysis showed, the causes included insufficient alertness and moral-psychological preparedness on the part of personnel to accomplish a difficult mission. Ideological and political indoctrination work in the period preparatory to the tactical air exercise boiled down basically to holding meetings, conferences, and briefing sessions, as well as general appeals and slogans, and was isolated from practical affairs. Everything was quiet at the airfield, in the classrooms, and at the simulators, that is, those places where pilots and specialist personnel most needed moral support and inspirational party word. Miscues on the ground connected with failure to appreciate the role of the human factor and of individual indoctrination work resulted in lower marks at the range.

This and other similar cases from the daily experience of Air Force units attest once again that an ideological worker should be wherever success of the common cause is being determined. Departments of social sciences at Air Force educational institutions are called upon to make a weighty contribution to the process of reorganization of the principal domains of ideological work. The point is that military educational institutions should graduate not only excellent specialists in military affairs but also skilled indoctrinators. In the line units they expect profound scholarly workups, practical recommendations on important problems dealing with improving ideological and



political indoctrination work, and maximum approach by this work to practical needs.

The ensuing conclusion, which proceeds from an appraisal of the state of ideological work in light of the decisions of the 27th CPSU Congress, is that what is needed is a radical strengthening of efficiency, purposefulness and conscientiousness in organizational and ideological work.

Let us take as an example the political training of personnel as a fundamental, most highly-organized form of political influence on the schooling and indoctrination of Air Force personnel. A great deal of experience has been amassed in this area. We have endeavored in the past and continue to endeavor to enlist the best propagandist cadres to serve as group leaders. On the other hand, we still today witness instances of poor organization of instruction classes and a less than conscientious attitude on the part of certain Air Force command personnel, political workers and propagandists toward political instruction of personnel, as well as errors in method.

We cannot accept this situation. Reorientation in this area should begin with a resolute shift by command personnel, political workers, chiefs of staff and aviation services from lip-service acknowledgement to fully-aware understanding of the importance of political indoctrination of military personnel. The party congress proceedings were permeated with such categories as new technical policy, structural policy, and investment policy.... Precisely policy! And one must treat political instruction as a policy aimed at prompt and timely accomplishment of the tasks stated by the 27th CPSU Congress in the area of reorientation of people's political awareness.

Many Air Force political agencies and party organizations have amassed instructive experience in selection, training and indoctrination of leaders of officer Marxist-Leninist training groups, warrant officer political instruction groups, political instructors for compulsory-service enlisted personnel, as well as in the party training, economics education, and Komsomol political education system. Today, however, this experience is no longer satisfactory, primarily because today's political training group leader is a propagandist of a qualitatively new category. He conveys knowledge to the primary military unit and exerts political influence on personnel by the most effective method -- individual indoctrination, and considers the specific features of each individual. He is an activist ideological warrior, a key figure in training and indoctrination activity. And we must work a great deal and painstakingly with him, in order to improve the quality of political training not in words but in actual deeds, by activating the human factor obtaining genuine incremental growth in improving combat skill, strengthening discipline, as well as in other practical areas of military activity. This is why purposefulness and determination are so important here. Any attempts to "pretend acceptance of reorientation" must be rejected immediately and permanently.

Concerend with enhancing the role of the propagandist as a political organizer and indoctrinator of the masses, our party's Central Committee at the same time demands that we be unswervingly guided by the Leninist thesis that

success in any endeavor is determined by how actively and conscientiously the masses take part in it. Particular attention was directed to this lesson in the Central Committee Political Report to the 27th CPSU Congress. It is also of importance for Air Force ideological workers. Its essence is as follows: forming the political consciousness of Air Force personnel is the obligation not only of commanders, political workers, and activist agitators and propagandists. The greatest significance of the reorientation of party leadership style and methods which is taking place lies in mobilizing all creative forces and ensuring that party members take even more active part in indoctrinating ideologically conditioned air warriors who are strong by their solidarity and skill, ensuring that each and every member of the Air Force makes a contribution toward increasing the Air Force's combat readiness.

The new tasks demand an innovative approach to their implementation. This also applies to improving agitation-propaganda work, which occupies a leading position in ideological activity.

V. I. Lenin taught that word is also deed. The party has always relied on the force of the word of truth, which has inspired, united, and mobilized people to perform valiant labor and military exploits. Today indoctrination work with the aid of the word demands considerably greater psychological sophistication and pedagogic tactfulness.

Presentations by officers V. Bezlatnyy, Yu. Mulik, and many other of our propagandists, for example, evoke a lively response in the hearts of Air Force personnel. They endeavor not to sidestep acute problems, to offer exhaustive replies to the most topical practical issues, to reveal and explain the reasons for deficiencies, and to suggest ways to correct them. Unfortunately, however, one still encounters in agitation and propaganda work a great deal of empty talk, excessive attention to form with detriment to content, and useless ballyhoo which, to quote V. I. Lenin, results in "purely bureaucratic murder of a living endeavor." One still encounters "honorary members" of agitation and propaganda teams and lecturer groups, shopworn lectures and reports, and hastily-organized activities. This must be vigorously combatted. Each and every propagandist's presentation should be viewed as a lively, frank discussion with people about the problems which interest and concern them, seeking an equally frank, open response. Profoundly personal, candid and, I would say, heartfelt propaganda, a conversation with people about people, on a firm party foundation -- this is today one of the principal requirements on our propaganda and agitation.

That new element which today is entering our lives has stirred up military personnel-agitators and has given a boost to their creative energies. The aim is to direct people's knowledge, experience and energy toward accomplishing the basic, fundamental tasks facing the Air Force.

As we know, the level of military discipline in the subunit and unit is a most important indicator of the effectiveness of indoctrination work and its linkage with practical realities. All of us sense how much more persistently and keenly matters pertaining to ethics and morality, which comprise the foundation of strong discipline and the cohesiveness of multiethnic military collectives, have recently been raised. Hence the special demand placed on



Air Force ideological cadres as the main organizers of the moral indoctrination of Air Force personnel, for experience indicates that the roots of breaches of regulations lie in serious deficiencies in the political, military, moral and legal indoctrination of aviation personnel and inadequately organized efforts to unify military collectives.

We speak a great deal about the need for further strengthening of military discipline, but we sometimes do not do everything necessary to accomplish this. Political agencies and ideological cadres should first and foremost be aware of the entire acuteness of the problem. They should proceed from the position that there is no social, and particularly no political basis in the military for negative phenomena. One can easily see this in the example of right-flankers in the socialist competition in the Air Force, which is being conducted under the slogan "We shall carry out the decisions of the 27th CPSU Congress, we shall reliably defend the achievements of socialism!" Vanguard Air Force regiments, squadrons, and flight operations ground support units and subunits have for many years been operating without gross breaches of military discipline and without air mishaps. For more than 12 years now, for example, there have been no serious accidents in the unit in which Lt Col A. Polishchuk serves as political worker. Just as in other military collectives, there is taking place here a practically continuous process of renewal and upgrading of personnel and equipment as well as increasing complexity of assigned tasks. One thing remains unchanged -- constant concern for the men, attention toward each and every airman, the volition and firmness of commanders and supervisors in maintaining strict observance of regulations.

The campaign against the social evil of drunkenness also demands equal firmness and integrity. This is a task for the party and nation as a whole. We are realists and should fully realize that the job of firmly establishing a sober way of life will be a tough one. Success can be achieved only if the entire collective takes part in the effort, waging it unrelentingly and making no compromises.

It is for good reason that such great importance is attached today to matters of discipline. The party views this as one of the decisive conditions for achieving a high rate of socioeconomic development and further increase in our country's defense might. The new approach to efforts to strengthen military discipline as spelled out by the general party guidelines requires first and foremost that we increase the responsibility of leader personnel and party organizations for unwavering observance of order and the rules prescribed by Armed Forces regulations. Practical experience convincingly demonstrates that discipline improves slowly wherever there is no firm-willed one-man commander, wherever individual organizational work does not follow in response to instructions, and where appeals for observance of regulations ring out against a background of patent errors in organization of personnel duty and training, lack of follow-up verification and adequate resources standing behind orders and instructions. It is therefore necessary immediately to take all steps to ensure that the very tenor of life in the military, precise organization of performance of duty, combat training, and off-duty life of Air Force personnel constitute a disciplining factor. Party and Komsomol organizations are called upon to offer command personnel effective assistance in this area. It is their duty to guarantee personal exemplariness on the part of each and every

Communist and Komsomol member in the air, on the airfield and in the barracks, in their work and conduct. And one should begin with increasing the level of integrity, party and Komsomol accountability.

Regardless of what direction we take in joint activities by command-political cadres and party organizations, at every point practical realities insistently dictate the need for a resolute strengthening of one-man command. It is also important to continue displaying unflagging concern with forming in Air Force command personnel the psychological qualities and methods skills of the one-man commander and to do everything possible to foster an increase in the authority of leader personnel. Instilling in servicemen respect and love for their commanders and firm readiness and willingness to carry out an order and assigned task has been and continues to be one of the main directions in ideological indoctrination and cultural-educational work.

We are living and performing the tasks assigned to the Air Force by the party in a conflictive and potentially explosive world. Imperialism is exerting ever-increasing military, economic, ideological, and psychological pressure, forcing the USSR and the other Warsaw Pact nations to undertake requisite measures to strengthen their defense.

The present military-political situation, which the 27th CPSU Congress called practically the most troubling and alarming period in history, requires new approaches to evaluating the state of combat readiness of the Air Force, the political vigilance and moral-psychological preparedness of personnel for a real military danger. Work at many levels is going on in the units and subunits to ensure that an entire aggregate of ideological and organizational measures is being employed in peacetime to prepare Air Force personnel to carry out a combat mission to defend the USSR, its allies and friends. A decisive part of the component elements of this training lies in the spiritual/intellectual domain. Therefore mobilization of spiritual and intellectual potential, reorientation in short order of the consciousness and entire way of thinking of air warriors and aviation service specialists, and the creation of a psychological mood to combat a powerful, technically-sophisticated adversary continue to be a paramount task, a most important role in accomplishing which is assigned to ideological workers.

Nevertheless some leader-Communists lack the ability to concentrate their efforts on achieving high quality of flight training and mastery by Air Force personnel of their occupational specialties. Certain aspects of ideological support of flying proficiency and flight safety are being handled weakly. In many units and subunits propaganda of the military oath of allegiance, USSR Armed Forces regulations, and military technical propaganda have proven inadequate. Local political agencies and party organizations must take decisive steps to correct these and other shortcomings. Greater aggressiveness and innovativeness should be displayed in publicizing the professions of pilot and navigator and instilling in Air Force personnel love of military aviation, pride in belonging to this service, and the endeavor to build upon its fine fighting traditions. Each and every Communist, each and every officer should consider participation in this important and necessary work to be their duty.

Successful implementation of the tasks proceeding from the decisions of the 27th CPSU Congress in the area of ideology is inconceivable without radical improvement of organizational ideological activity proper.

Today's ideological workers, and leader personnel in particular, are organizers first and foremost. There are many officers in the Air Force who are distinguished by efficiency, concreteness, a realistic appraisal of achieved results, and an endeavor constantly to compare propaganda effort with combat training results and the state of military discipline, and to influence this interlinkage in an appropriate manner. Precisely such an approach is needed right now. Word should be followed by deed. Does this always happen in actual practice?

Sometimes streams of critical comments gush forth at party meetings, conferences and other events. Unfortunately, however, few commanders, political workers, and party activists, while noting deficiencies and errors in performance of one's job, give recommendations and suggestions on correcting mistakes. We Communists do not want diffuse discourse and general appeals. We want more substance, analyticity, direct appeal to people, and positive experience and know-how, which should be used first and foremost in teaching and indoctrinating Air Force personnel. A responsible and innovative approach to the assigned task and aggressive influence on the course and end results of combat training and socialist competition, particularly to accomplish successful completion of the summer period of training and the current training year as a whole, is presently the main task for organizers of ideological indoctrination work and all Air Force ideological activists. It is important to work persistently to seek out and find new possibilities for increasing the strength of the party word, to promote through practical deeds an increase in political consciousness and an active experiential posture by Air Force personnel in accomplishing the tasks of strengthening combat readiness, flight safety and discipline. This is the duty and calling of ideological workers and constitutes their specific contribution toward successful implementation of the decisions of the 27th CPSU Congress.

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CSO: 9144/382

#### HANDLING SOCIALIST COMPETITION IN TOP SQUADRON

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 4-5

[Article, published under the heading "For a High Degree of Combat Readiness," by Military Pilot 1st Class Lt Col A. Shashkov: "The Commander Totals up Performance Results"]

[Text] Flight operations had come to an end. Squadron commander Maj V. Melnikov spread out the flight operations schedule and noted with satisfaction that all scheduled training activities had been performed and that the subunit's flight personnel and successfully accomplished their tasks. This flight operations shift culminated a month of intensive labor by aviation personnel.

The next day unit personnel gathered at the officers' club. Summarizing combat and political training performance results, the regimental commander announced that the squadron commanded by officer V. Melnikov had taken first place among the subunits on the basis of socialist competition results. In spite of the fact that his squadron contained young pilots who, as we know, require special attention in training and indoctrination, the tasks assigned to the collective are being carried out with excellent quality.

How did the men of this squadron achieve such an excellent end result? I believe that it is first and foremost due to a well-organized training and indoctrination process. The squadron commander merits praise. Maj V. Melnikov is a vigorous and determined officer. His high degree of professional competence, demandingness on himself and his men, as well as his exceptional conscientiousness make it possible to indoctrinate subordinates primarily by personal example. The process of combat and political training in the subunit and the organization of competition encourage the men to put out at full effort. On the ground and in the air, the men compete for excellent performance during every flight operations shift and every combat training mission. There is competitiveness between flights, groups, and aircrews. The squadron commander and his deputy for political affairs endeavor to ensure that publicity and the possibility of comparing results and emulating advanced know-how are realistic.



In totaling up competition results for the month, for example, the squadron commander places primary emphasis on the men and their specific doings, successes, and deficiencies. A great many kind words were spoken, for example, about flight commander Maj A. Puzankov. This officer does not wait for instructions from higher up. He deals personally with training and indoctrination of the young pilots, and he implements in a practical manner the following principle: each commander teaches his subordinate. This vanguard officer has had a great deal of instructor experience and considerable methods training. He conscientiously passes on his knowledge to the younger men.

The subunit led by Maj V. Sitnik, from whom one can also learn a great deal, competes with this flight.

The squadron commander possesses thorough, detailed knowledge of the state of affairs in the subunit he leads. He constantly focuses attention on accomplishment of assigned tasks. He himself is a highly-proficient instructor in all weather conditions and in all categories of combat flying. He himself therefore conducts selective testing of his men's job proficiency.

During flight operations Major Melnikov takes the time to visit the tower, observe his men's takeoffs and landings, and check turnaround readying of aircraft between sorties by engineer and technician personnel. His deputies and the lower-echelon commanders keep track of air time logged, squawk-sheet comments, aircraft equipment malfunctions through the fault of personnel, quality of performance in working on combat training tasks, and meetings of socialist pledges.

In his subunit they have the following procedure: at the beginning of each month the squadron commander, his deputies, the flight commanders, servicing group chiefs, and flight technical maintenance unit chiefs gather together facts and figures for a future summary report.

The squadron commander is greatly assisted by his deputy for political affairs, Maj D. Chernov. He skillfully directs the work of the party and Komsomol organizations, scrutinizes combat and political training plan fulfillment, periodically looks through the specialized-subject training class logs, and checks the record of the men's simulator sessions. This political worker is quite familiar with the level of proficiency of each and every pilot and technician, and he continuously monitors the men's political instruction and off-duty activities. He endeavors to keep the commanding officer briefed at all times on preventive measures which have been conducted. It is true that sometimes he encounters an occurred incident which should be studied, appropriately evaluated, and a response given. Sr Lt O. Lukyanenko, for example, once was drunk on duty. He was severely punished for this. It was ascertained that he had also appeared in an inebriated condition in public during off-duty hours, but a firm response had not been given to this.

Maj V. Melnikov brought this up during the summary of performance results. He severely reprimanded officer O. Lukyanenko's superior for failure to take action, and he leveled stern criticism at Lukyanenko's comrades for failing to

prevent this drunk and disorderly conduct through their own efforts and permitting their fellow soldier to commit a gross breach of discipline.

When organizing competition in the squadron, aviation personnel constantly compare the points of the socialist pledges entered into their workbooks with specific actions. They work hard to achieve further increase in the combat readiness of their subunits, effective utilization of flying time, high-quality accomplishment of the flight training schedule, and strengthening of military discipline.

This can be traced in the examples of the flights commanded by officers A. Puzankov and V. Sitnik. These subunits have their accomplishments, as well as unresolved problems. Both commanders are pilots 1st class and veteran instructors. Each endeavors to maintain in the men a spirit of competition and the endeavor to achieve maximum results. Both flights contain young combat pilots -- recent pilot school graduates.

On the eve of the training year these flight commanders looked through the lieutenants' service records, conscientiously studied their level of training, held individual interviews with them, and advised them on what performance levels to target in their combat training plan. The young pilots made individual pledges and challenged their comrades to competition. They began working hard to achieve high quality of commander training from the very first classes.

Noting their men's thirst for knowledge, commanders would always commend the best individuals of all those who had demonstrated excellent knowledge in any subject, in order to increase the spirit of competitiveness. In navigation classes, for example, the instructor singled out Sr Lt V. Chizhov from officer A. Puzankov's flight, while in aerodynamics classes the greatest knowledge was displayed by Sr Lt V. Tarasenko, one of officer V. Sitnik's men.

A spirit of competitiveness is constantly maintained among the pilots. Maj A. Puzankov, for example, upon returning from a meeting of flight commanders, told his colleagues what items had been discussed at the meeting. In particular, he discussed methods of analyzing quality of flying technique. Subsequently they discussed in the flight the manner of determining pilots' level of job preparedness and examined the question of practical implementation of individual training, taking into consideration intervals between flight operations. This approach to flight instruction and grading flight performance was of interest to the flight commanders, although it was not immediately adopted. Some were satisfied with the existing system, to which they did not want to make adjustments.

In time the experience of officer A. Puzankov's flight demonstrated the viability of this method. The advanced know-how was synthesized and made available to all instructor pilots. Dual instruction and check rides in two-seaters proved more effective. As a result the young pilots began more solidly assimilating certain elements in flying technique and combat flying. Summarizing results, the squadron commander used this example to show how one should seek out reserve potential for improving the quality of combat training and effectiveness of competition.



Maj V. Melnikov stints neither time nor effort in organizing the totaling up of performance results. Generally they are hard at work at squadron headquarters on the last two days of the month: they are preparing in advance diagrams which show progress in accomplishing training schedules and progress in socialist competition, and choose the best pilot test cards in combat flying activities, which make it possible to apply strict criteria in determining the competition winner. Party and Komsomol activists work together with the executive officer. Political training results are refined and detailed, and wall newspapers, photonewspapers, and operational news sheets, put out during the month, are readied for general review.

Prior to totaling up results, the commanding officer gathers at squadron headquarters flight and engineer-technician supervisory personnel. Facts and figures are reconciled at this meeting and, on the basis of achieved results in combat and political training as well as socialist competition, opinions are given on competition places awarded to flights, servicing groups, and aircrews. Candidates for the title of "Best Pilot" and "Best Technician" are discussed.

Devised methods and criteria for comparative evaluation of competition results consider the overall point score for meeting of pledges by personnel, the grade for combat training sorties, quality of flight operations support, flying hours logged by pilots and aircraft, maintenance of aircraft and personal weapons, average grade for all subjects, a gravity factor for breaches of military discipline, as well as point scores for cross-training to adjacent occupational specialties, athletic accomplishments, and adoption of efficiency innovator suggestions.

The month's winner in competition among military personnel is determined by the highest overall score. At the same time the squadron commander, aware that effectiveness in competition depends in large measure on specifically accomplished pledges, also cites individuals who have distinguished themselves even on some one item.

Pilot Capt Yu. Kostitsin, for example, had included in his pledges for the winter period of training the adoption of an efficiency innovation suggestion. In January he demonstrated a model simulating the inertial rotation of a fighter. Last year Yu. Kostitsin built a visual aid: a navigation training plan-position device which helps a pilot practice attention distribution.

It is apparent from this squadron's experience that when totaling up results it is necessary not simply to enumerate positive or negative points but thoroughly to analyze, reveal and criticize that which is hindering progress. This helps avoid repetition of the same mistakes.

As practical experience shows, totaling up performance results produces considerable benefit when the attitude of individual airmen toward performing their job duties and meeting their socialist pledges is also rated. Maj V. Melnikov endeavors in his report to encompass all aspects of performance of job duties and combat training. To accomplish this he cites the most typical examples from the subunit's daily activities. In conclusion he names the

socialist competition winners. For example, Maj A. Burankov's flight and V. Denisyuk's crew turned out to be among the performance leaders. A servicing group and section were cited. Several of the men were awarded a certificate and given a commendation, including Capt A. Butserin. In conclusion the subunit commander assigned the men a task for the following month.

The experience of the squadron under discussion indicates that effectiveness of competition is determined in large measure by the quality of totaling up results. It makes it possible in a prompt and timely manner to detect reserve potential, reveal difficulties which arise, specify ways and means of correcting them, and successfully to accomplish stated performance goals. Intensity of combat training is always high in this squadron, and a vigorous campaign is conducted to accomplish pledges. The ranks of skilled pilots and technicians are growing, and a high level of combat readiness is maintained. This subunit is rightly considered one of the best in the unit.

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CSO: 9144/382

#### IMPORTANCE OF INSTILLING SENSE OF PERSONAL RESPONSIBILITY IN LOWER RANKS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 6-7

[Article, published under the heading "Thoughts After the Congress," by Sr Lt V. Shevchenko, flight technical maintenance unit chief: "Personal Responsibility"]

[Text] I once witnessed a conversation between flight technical maintenance unit chief Sr Lt Yu. Soveyko and airframe and powerplant mechanic WO T. Savich.

"You are a pretty fair specialist," the officer said, "but you show no initiative or commitment in your work. And yet today it is not enough just to do one's job...."

"I am low man on the totem pole. I do what I am told. Anything else is not my affair," the warrant officer replied with indifference.

"That is a lousy principle: I mind my own business. Someday it will get you in trouble, Savich," Senior Lieutenant Soveyko said with annoyance.

The flight technical maintenance unit chief's words were almost prophetic. Several days later an unpleasant incident occurred in the subunit. After fueling his aircraft during routine flight operations, the mechanic screwed on the filler cap but tightened down the access cover by only two screws, planning to finish buttoning it up later. But he forgot to do so. The pilot fired up the engine and proceeded to taxi out to the active. It was only thanks to vigilance on the part of the people at the technical inspection post, who spotted the loose cover, that an accident was avoided (during flight the airstream could have torn the cover off and sent it right into the engine intake. The aircraft was returned to the flight line, and the incident was recorded as a mishap-threatening occurrence.

This time Warrant Officer Savich got off with a slight scare, as they say, since the entire responsibility for the incident lay on the shoulders of aircraft technician Sr Lt V. Makeyev. This officer was severely punished for failure properly to check the work done by his subordinate. The mechanic, however, was given a mild rebuke for his errors of omission, as this was

apparently adjudged to be an unfortunate chance occurrence. Everybody was in agreement with this assessment, including the author of this article.

I recalled this incident after I had once again carefully read through the proceedings of the 27th CPSU Congress. CPSU Central Committee General Secretary M. S. Gorbachev's speech at the congress provides a great deal of food for thought, especially when he asks whether we are correctly evaluating the results of our labor and that of our subordinates. At first glance everything seems quite simple: if a person works conscientiously, praise him; and if he works halfheartedly, apply against him the moral and administrative means at your disposal. But in actuality things are much less simple. The classic pattern of influencing others is not always appropriate and does not apply to everybody, especially if one more rigorously takes into account a person's individual character traits and sense of responsibility for his actions. Unfortunately at times we fail to give serious thought to this.

If one more closely examines the incident described above, one reaches the conclusion that it was not of a chance nature; its roots lie much deeper than it seemed to us at the time.

Everybody in the subunit knew that WO T. Savich lacked initiative in his work and other service-related activities. People had an indifferent attitude toward this, however. The attitude was that he does his job the best he can, and it would be somewhat awkward to demand more of him, since he is only a lowly mechanic. And nobody considers the fact that it is but a short distance from lack of initiative to irresponsibility. And this was the case. Not only Warrant Officer Savich is culpable in this matter. Let us be frank: the situation for an air mishap was created by the collective's unfirm attitude toward men who failed to display proper responsibility for performance of their job duties.

I do not know how gradation of responsibility begins, but I am convinced that it exists and that it is absolutely wrong, because one encounters it every day. And yet in the Air Force success in accomplishing a combat mission depends on everybody, from the lowliest private to the highest-ranking officer. Everybody is responsible for the security of the homeland. As a person rises to more responsible duties, his range of obligations broadens, the scale of the tasks he performs increases, and he bears greater responsibility. But can one divide jobs into important and unimportant? In their daily affairs both the highest-ranking general and the lowliest private are guided by the demands of the military oath of allegiance and military regulations, which apply equally to all. And observance of regulations is a matter of a person's honor and conscience.

Nevertheless, when the subject of discussion is errors of omission made by low-ranking aircraft maintenance personnel, one frequently hears the statement that a primary-rank enlisted man or warrant officer has been very mildly punished. Aware of the lax attitude toward them, individuals who are not entirely conscientious place less demandingness on themselves and attempt to pass off responsibility to their superiors.



And here is what is surprising. At party and Komsomol meetings and at various conferences a great deal is said about correct words pertaining to the need for Air Force personnel to develop initiative and productive activeness, efficiency and responsibility. As for actual deeds, things are not moving very rapidly in this direction. And "objective" excuses are found: a difficult childhood, a person's lack of communicativeness, inner lack of composure, etc. Naturally one must consider these nuances. But in my opinion the main reason is the fact that we frequently say one thing at meetings and do something quite different in our daily activities. I shall cite the following example as confirmation.

The following day, after a Komsomol meeting, at which the question of increasing the responsibility of Komsomol members for meeting socialist pledges was discussed, mechanic WO V. Syrtakov addressed keynote speaker Capt A. Kharkov, acting aircraft armament group chief, and suggested a specific method of speeding up the job of mounting bombs. This is unquestionably an important topic. But Captain Kharkov brushed him aside.

"You go do your own job. We know our business."

The warrant officer walked away, and I doubt seriously if he will ever approach the group chief with another idea. After all, it is not a pleasant experience when somebody tells you, even if couched in a polite form: "Mind your own business, this is beyond your intellectual abilities...." Naturally this kind of a situation squelches any initiative. And such instances are by no means isolated.

And we are evidently dealing here not only with an elementary lack of attention toward others. In turning away initiative by a subordinate, a commander or superior, without even realizing it, is pushing him away from solving vital problems. And after this one should not be surprised at the fact that certain warrant officers, and even officers, observe the principle: you are in charge, so you do the thinking and bear the responsibility. I feel that there is a very important ethical point here. Frequently we demand only one thing of subordinates: that assigned jobs and tasks be performed quickly and precisely. But we fail to instill respect for one's job and pride in being a member of the Air Force. But experience suggests that there is considerable reserve potential here for increasing people's initiative, activeness, and sense of responsibility.

The party has assigned large and difficult tasks to us defenders of the homeland. Their accomplishment depends on the quality of labor on the part of Air Force personnel, for overall success is directly proportional to the size of contribution each of us makes. Thus responsibility for accomplishing the task should be personal.

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## EFFECT OF EXTENDED TIME AWAY FROM FLYING ON WINGMAN COMBAT SORTIE SKILLS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 7-9

[Article, published under the heading "Flying and Psychology," by Military Pilot 1st Class Lt Col A. Zolotarev and Candidate of Medical Sciences Maj Med Serv V. Kozlov: "If the Wingman Has Become Rusty"]

[Text] After three months without flying, Capt B. Gladkov flew as wingman in a two-aircraft element on a training sortie involving engagement of ground targets. It was an experimental sortie, and the helicopter was equipped with special monitoring and recording devices. The purpose of the experiment was to establish what changes take place in pilots flying wingman after an extended period on the ground and how they influence weapons delivery effectiveness. As was to be expected, things did not go entirely successfully. The pilot did not feel as smooth and confident as he had flying the same kind of sortie at an earlier date. It sometimes happens that, for one reason or another, a pilot is brought back into an active role in accelerated fashion following an extended period without flying. Without having properly refreshed his flying skills, he goes out on combat training sorties as a member of a group of aircraft. In these instances as a rule weapons delivery results are poor, and formation-flight safety procedures are violated.

Usually either insufficient practice in operating a weapons control system or faulty actions by the pilot are stated as the cause of such incidents. Unquestionably these factors can be the cause of poor effectiveness by a wingman. Most frequently violations occur, however, due to inadequate forming of skills in formation-flying a fixed-wing or rotary-wing aircraft. This is indicated by the results of the study.

A psychological analysis of a pilot's activities in group or formation flight indicated that a wingman performs two high-motivation tasks on specific-mission flights: he flies the aircraft and maintains the prescribed position in the formation. These tasks do not compete with each other for the experienced wingman. While devoting considerable attention to monitoring the position of the leader's helicopter, he does not diminish his flying technique. This is achieved because the wingman has on the one hand developed the skill of flying with predominant use of noninstrument signals (noise,



vibration, acceleration sensations, cockpit-exterior reference points) and information received from the leader, and on the other hand the skill of predicting changes in formation parameters on the basis of perceiving noninstrument signals from his own helicopter. On the whole, however, maintaining position in formation is an independent action which includes flying technique. When flying a weapons delivery sortie, the wingman is also performing a third task: searching for and attacking the target. It is no less significant than the two preceding tasks, but it is in a competitive situation with them. Consequently, if a pilot devotes more time to performing the combat mission, this will affect the quality of maintaining formation, and vice versa. Therefore developing an optimal structure of activity, and particularly mastering correct distribution and switching of attention in these conditions is a fairly complex problem. Experienced pilots, however, as is indicated by experiments and practical flying experience, with adequate persistence ultimately develop an optimal algorithm of actions in formation flying.

The following table shows the structure of distribution and switching of attention by experienced wingmen.

1 Ведомые летчики	2 Показатели					4 Частота переноса взгляда (в мин)	
	3 Общее время контроля (в %) и длительность отдельных фиксаций (в с)					10 общая	11 на ведомый вертолет
	5 вне кабины	6 в направлении ведущего вертолета	7 в направлении цели	8 в направлении, противоположном ведущему	9 на приборы		
12 Хорошо тренированные	97.2	42.3 0.8-5.4	54.9 0.7-3.7	— —	2.8 0.8-1.1	30	14
13 После трехмесячного перерыва	95.9	81.1 4.6-18.5	14.8 0.4-1.4	— —	4.1 0.2-1.5	24	10

Key to table: 1. Wingmen; 2. Indices; 3. Total monitoring time (as percentage) and duration of individual instances of directing attention (in seconds); 4. Frequency of shifting gaze (in minutes); 5. Cockpit exterior; 6. In the direction of the lead helicopter; 7. In the direction of the target; 8. In a direction opposite to the flight leader; 9. Instruments; 10. Overall; 11. To lead helicopter; 12. With considerable current flying; 13. After 3 months on the ground

These data indicate that during the phases of the run on the target the wingman devotes an average of 42 percent of the time to monitoring the position of the lead helicopter and more than 54 percent to interaction with the target. This distribution of attention between two important sources of information (lead helicopter and gunsight) ensures sufficiently effective accomplishment of each task.

The actions of a wingman who has not flown a combat sortie for quite some time, however, differ considerably. As we know, an extended period between flying leads to loss of flying skills. This means that in flying a mission a pilot more frequently controls his actions consciously. His structure of distribution of attention and controlling motions changes (their number and amplitude increase), and there is an increase in neuroemotional stress. One should bear in mind that formation flying skills are less persisting than flying skills in general, and therefore they are lost more rapidly. At the same time it is precisely these skills which form the basis of accomplishing one of the main tasks -- maintaining position in the formation. Consequently, a conflict arises between a partially lost skill and the considerable responsibility for high-quality accomplishment of the mission.

Another feature is also of interest. As was noted, flying and maintaining formation are not competing tasks for a veteran pilot. Nevertheless, following an extended time on the ground, skills in flying with predominant use of noninstrument signals and information from the flight leader are lost. This means that for a wingman commencing formation flying after extended time on the ground, flying his aircraft and maintaining position in formation become competing tasks in some measure. It follows from this that in addition he is also assigned weapons delivery tasks, naturally he is simply unable to carry them out together with high-quality flying. Somewhere an error of omission will be inevitable.

How does this work out in practical terms? The figures in the table pertaining to distribution and switching of attention by a wingman who has not flown for 3 months indicate that the pilot devotes his main attention (more than 81 percent of his time) to checking his position in formation and a small part of the time (approximately 14 percent) to performance of weapons delivery. Duration of gaze in the direction of the leader is 4-5 times that of experienced pilots. The priority nature of the task of maintaining formation parameters is due to the fact that the wingman has a clear realization of the potential consequences of violating safety procedures in formation flight.

Analysis of other indices has enabled us to establish that, in addition to poor quality of combat mission performance, this pilot's total number of control motions, with high neuroemotional stress, was twice the normal number. In addition, and this is very important, in spite of the high percentage share of time spent on checking formation parameters, he was unable to maintain them. This is due primarily to the fact that the wingman had not refreshed his skills in visually gauging the position of the lead helicopter.

Without going into detail on the program to make this pilot current in his flying skills once again, we shall note that by the sixth sortie overall formation parameters monitoring time had dropped to 62 percent, and the average duration of individual gaze fixing had dropped to 3.8 seconds.

The results of the study indicated that it is almost impossible to achieve a high degree of effectiveness in performing a combat mission as well as precise maintaining of formation parameters with insufficient forming of control skills in formation flying. It is necessary first to hone skills in formation

flying, which requires practicing visual estimation on the ground and forming skills in precision formation flying. Unwarranted pushing of the wingman training process, however, particularly at the stage of forming skills in formation flying, has an adverse effect on quality of combat flying proper and on flight safety.

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## NAVAL RECONNAISSANCE AIRCRAFT CONDUCT SUCCESSFUL SEARCH FOR "AGGRESSOR" SHIPS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 8-9

[Article, published under the heading "Visiting Our Comrades in Arms," by Capt 2nd Rank S. Turchenko: "Ocean Search"]

[Text] A detachment of "aggressor" combatants had put out from its base. Where was it headed, and what was its mission? Only air reconnaissance could provide answers to these questions. A pair of reconnaissance aircraft took to the air.

The flight leader was detachment commander Maj B. Lekomtsev, one of the unit's most experienced pilots. He is highly praised by his comrades. They related, for example, that when he was still an aircraft commander he would be assigned the most difficult missions. On two occasions he got into situations from which only a true ace could emerge victorious. And when he became a detachment commander he had the ability both to mobilize his men and pass on to them his wealth of experience. Within two years all the detachment's pilots and navigators boosted their proficiency rating, and the detachment earned a rating of excellent.

...Word of mouth had painted in my imagination a man of heroic physical proportions, but upon meeting Lekomtsev I saw that he was stocky and of medium stature. He spoke in a low voice, slowly, as if sunk in thought. He provided only the meagerest biographic data on himself. He was born in the Udmurt ASSR. In his childhood he never saw an airplane or the sea close up. He was drawn into aviation by books about Chkalov and Vodopyanov, which he had read avidly. He graduated from service school with honors. He was entitled to choose where he wanted to serve. He requested the Northern Fleet. And he has never regretted this choice. He has found here a second home.

When the conversation turned to the detachment's successes, he stated that primary credit for this goes to the party organization, and that he had lucked out with instructor Leonid Mitrofanovich Balyukov, an excellent pilot and a fine educator. He was an invaluable assistant to Lekomtsev. As I listened to him, I thought to myself: they are right when they say that intellectually rich and businesslike, efficient individuals are always modest.



A genuine aerial reconnaissance pilot, before heading aloft, will thoroughly study the route, calculate different mission variations, mentally put himself in the "aggressor's" place through dozens of variations, and only after this will decide that he is mission-ready.

Lekontsev had received a thorough briefing on the air situation and knew that they would be making a long flight out over the ocean and that they would have to sweep a vast area. But neither he nor his men doubted that they would be successful, first and foremost because they would be operating outstanding equipment which they had learned to use with skill.

Even the external appearance of a reconnaissance aircraft gives a sense of swiftness and strength. The extremely large wingspan, the cigar-shaped fuselage, somewhat reminiscent of the hull of a submarine, and the fuselage interior, also reminiscent of a compartment in a small submarine, lined on both sides with complex electronic equipment, the very sight of which inspires respect for the men who operate it. Such an aircraft is unquestionably designed to perform the most complex reconnaissance missions.

Such a magnificent aircraft would have been beyond the wildest dreams of the first naval air reconnaissance pilots. One of the first Russian seaplanes, the M-1, developed in 1913 by aircraft designer D. P. Grigorovich, had a flying weight of only 620 kg and a top speed of approximately 100 km/h. The development of naval reconnaissance aviation both before and after the war is linked with the name of Georgiy Mikhaylovich Beriyeu. His MBR-2 naval reconnaissance aircraft was used in the initial period of the Great Patriotic War. This aircraft had a speed in excess of 200 km/h and a range of more than 1,000 km. These were enviable performance capabilities for those times. Today's naval reconnaissance aircraft, equipped with the most modern gear, are superior to their predecessors several times over in all parameters.

But equipment means nothing without the men who operate it. Although aircraft fly according to quite objective laws of aerodynamics, there is also another lifting force, deriving from the profound knowledge and self-sacrificing labor of pilots and navigators, engineers and technicians, and junior aviation specialist personnel.

...Upon completing his climbout, Lekontsev switched on the autopilot and informed his crew over the intercom: "Men, we are presently in an area in which Captain Turkov flew during the war...."

Capt Nikolay Turkov became a reconnaissance pilot at the beginning of 1943, when the area of operations of Northern Fleet aviation had expanded, and it was therefore necessary to possess accurate information on the enemy throughout a vast theater of military operations. A great deal of flying experience in the Arctic and good knowledge of the specific features of this harsh region enabled Turkov rapidly to master his new job. He had to fly missions under the most difficult weather conditions. Based on the reports of this intrepid reconnaissance pilot, Northern Fleet air forces would reach an enemy convoy with unerring precision and deliver devastating attacks. By decree of the Presidium of the USSR Supreme Soviet, Captain Turkov was awarded

the title Hero of the Soviet Union in July 1944 for courage and valor displayed in the performance of his assigned missions.

The combat traditions of Northern Fleet aviators are honored and furthered in the air unit of which Lekomtsev's detachment is an element. A combat glory room has been set up here, reflecting the history and present day of naval reconnaissance aviation. Aircrews follow the practice of visiting this room prior to missions, in order once again to become permeated with the spirit of courage and valor of the aviators of earlier generations. Lekomtsev and his men also visited the room prior to mission departure, and each man took aloft an additional, special "weapon" -- the inspiring example of the combat veteran pilots.

...Several hours later the naval reconnaissance aircraft reached the search area, in which the "aggressor" was assumed to be located. Fog hung over the sea, while overhead was a star-filled sky and an orange moon. It is practically impossible visually to spot ships in such weather. The aircraft, however, carried "eyes" which were capable of seeing day and night, in any weather. It was as if the fog was opening up in the path of the aircraft. The navigators calculated each sector of the search area with mathematical precision.

The reconnaissance aircraft methodically swept the search area. Wingman Maj V. Shilyayev, to the training of whose crew the detachment commander had devoted a great deal of time and effort, was the first to report contacts. "Good man, he beat me," commented Lekomtsev without a shade of jealousy. It is good when the pupil not only repeats after his teacher but surpasses him as well. This meant that the training process had been correctly organized.

Maj Vasiliy Shilyayev is a military pilot 1st class. His crew has borne a rating of excellent for the last four years in a row. He receives nothing but the highest marks on all tasks. He displays innovativeness, determination, and persistence in developing and executing tactics. He has logged more than 2,500 flying hours.

The air reconnaissance crews had accomplished the mission with honor. They were now assigned a new mission, however -- to guide friendly submarines to the detachment of "aggressor" warships. The aircrews radioed precise coordinates. The "aggressor" was destroyed.

When the aircraft returned to their base, a happy bit of news was awaiting them: detachment commander Maj B. Lekomtsev and Maj V. Shilyayev, commander of a vanguard aircrew, had been awarded valuable gifts by order of the USSR Minister of Defense for successes in combat and political training.

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## CONSCIENTIOUS PREPARATION OF PERSONNEL EFFICIENCY REPORTS URGED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 10-11

[Article, published under the heading "Implementing the Decisions of the 27th CPSU Congress," by Lt Gen Avn Yu. Simakhin, chief, Air Force Personnel Directorate: "Evaluating Personnel by Specific Deeds"]

[Text] All of us are greatly impressed by the work accomplished by the highest forum of Soviet Communists -- the 27th CPSU Congress. The congress proceedings are permeated with a spirit of profound analysis of the state of affairs in the fundamental areas of the building of communism. They note the successes, give a frank assessment of negative phenomena which have occurred in recent years in the affairs of our society, define specific paths of our country's socioeconomic development during these next five years and right up to the year 2000, and ratify a new, revised version of the Party Program and Party Rules.

A serious discussion was also conducted at the congress on cadres, their training and indoctrination, proper selection and placement. Tasks in this area are formulated with crystal clarity in the Basic Directions of Economic and Social Development of our country: "Improve selection, placement, and additional training of executive personnel and specialists."

An important role in the diversified work with cadres in the military is played by performance evaluation which, as we know, is grounded on Leninist principles of working with officer personnel. V. I. Lenin demanded a most serious attitude toward selection of executive cadres, that they be studied and placed in such a manner that a person who is appointed to a given position is in the highest degree of conformity as regards his moral-political and professional qualities, experience, knowledge and propensities with the nature of the job he will be performing. It is important that he be a model not only in performing job-related duties but also that he display an example off duty, in raising his children, that he unswervingly observe standards of communist morality and ethics. Matters pertaining to improving work with military cadres must also be viewed today precisely from this standpoint.

A principal task is presently being performed in the process of preparing efficiency reports -- providing a comprehensive and objective assessment of

each and every officer and general officer. This is no simple matter. Commanders, political agencies, staffs, political cadre agencies, party and Komsomol organizations must carry out an entire aggregate of party-political and organizational measures of various types.

Just what does it mean to make a comprehensive assessment of an officer, thoroughly to analyze his personal qualities and job performance? One must be able to ascertain positive elements as well as those negative elements which hinder him from more effectively applying his knowledge and acquired experience and know-how in the interests of further increasing the combat readiness of his unit or subunit, maintaining firm observance of regulations and solid military discipline in light of the instructions of the 27th CPSU Congress and the demands of the USSR Minister of Defense and commander in chief of the Air Force.

First of all it is important to assess the level of an officer's ideological-theoretical training, his political maturity and spiritual-intellectual alertness, his preparedness, readiness and willingness successfully to accomplish the difficult, critical tasks connected with defending the achievements of socialism and the peaceful labor of the Soviet people in conditions of a steadily growing threat on the part of reactionary Western militarist circles, inspired and supported by the present White House administration.

As regards the job proficiency and competence of the subject of an efficiency report, it is very important to evaluate in an objective and comprehensive manner an officer's knowledgeability in the area of military theory, the extent of his specialized knowledge, his organizing abilities and volitional qualities, and his ability to assume responsibility at a critical moment and to act with initiative and knowledgeability in solving difficult problems.

One should bear in mind that every officer, in light of the demands of the 27th CPSU Congress, is independently studying the invaluable combat experience of the Great Patriotic War and, taking into account current advances in science and technology, is applying it in his daily practical activities, just as he is mastering third- and fourth-generation aircraft as well as modern means of command and control. In the process of preparing efficiency reports on Air Force officers, particularly leader personnel, it is necessary more rigorously and demandingly to evaluate their operational-tactical and specialized training. There should be no undeserved credit given or unnecessary relaxation of demands, and in particular there should be no overstated evaluations or nonobjective conclusions.

Unfortunately in the course of the preceding preparation of efficiency reports, some commanders and superior officers had a formalistic attitude toward officer interviews in particular, failed to create a favorable atmosphere promoting a frank conversation, and sometimes simply avoided the personal interview with the subjects of efficiency reports. There also occurred excessive attention to form with consequent detriment to content as well as a lack of integrity in the content of efficiency reports, as well as fixed pattern of wording in stating conclusions, simply to maintain the recommended efficiency report scheme and pattern developed over the course of

many years. Such errors were noted in the military collectives in which officers Yu. Mashintsev and B. Urmanov were serving.

Such a formalistic attitude to an important, critical business is contrary to the spirit of well-known documents which prescribe the procedures of preparation of efficiency reports and does definite damage to work with officer cadres, particularly efforts to instill excellent moral-political and ethical qualities in them.

Thanks to tireless concern for the Armed Forces by the CPSU, substantial changes are taking place each year in the development of our Air Force. Naturally new equipment and weapons introduce substantial changes in Air Force operational art and combat tactics. They affect the organizational structure of the Air Force and increase their combat power. In order fully to utilize the increased combat capabilities of the hardware and to raise combat readiness to a new and higher level, painstaking, selfless military labor is required, bold, intelligent and vigorous actions on the part of commanders, staff officers, engineers, and other leader-specialist personnel, as well as their psychological reorientation.

"Implementing the congress decisions," emphasized CPSU Central Committee General Secretary Comrade M. S. Gorbachev, "means improving and, wherever necessary, radically changing obsolete work style and methods, teaching cadres to resolve issues faster and more efficiently, and to assume responsibility. One should not fear decisive, bold, innovative actions."

The times demand that one approach preparation of officer efficiency reports innovatively, demandingly, in the spirit of the decisions of the 27th CPSU Congress. Commanding officers and superiors must bear in mind at all times that behind each efficiency report stands a living person, and that each individual has his own character and personality, his own strong and weak points, his own aspirations and interests. All this should be reflected in the efficiency report, so that it can be used to determine just what kind of person he is as a leader and indoctrinator, what potential he possesses, and where it is most advisable to utilize him in the future to further the interests of the service.

Unfortunately in the course of the preceding period of preparation of efficiency reports, there were instances of inadequate importance attached to thorough study of the ideological-political, moral and ethical qualities of officers, as well as determination of their actual experiential posture. For example, a subject's attitude toward participation in sociopolitical work and other mass activities also reveals his moral countenance and shows what personal contribution he is making toward the cohesiveness of the military collective.

In certain instances ignoring this factor led to superficial evaluation of officers' professional qualities. An efficiency report frequently suffered from an overabundance of standard wordings, and their indifferent lines sometimes obscured the living subject with his positive qualities, with affection for others and for his job, a person worthy of promotion, or, on the



other hand, with his specific shortcomings which prevent him from successfully carrying out his military duty.

How is it possible to determine an officer's political and professional qualities and his attitude toward his job duties if an efficiency report is filled with such standard phrases as, for example: "He flies boldly and confidently," "He is not unduly affected by forced ground time between flying," "He knows regulations well and skillfully applies them," and "He displays demandingness"?!

Of course on the basis of such depersonalized, general formulas it is difficult to gain a true picture of an officer, to sense the strength of his character and will, his selflessness, spiritual/intellectual and physical energy in performing his military duty to the homeland. They fail to show the main thing -- the actual contribution being made by the subject of the efficiency report toward increasing combat readiness, mastering modern aircraft, and improving the training process.

It is very important that, in the course of studying officer personnel, commanding officers and superiors personally take part in the conduct of training activities and organizing flight operations shifts, in preparing for tactical air exercises and other activities, as well as helping increase their job-related skills on the basis of the principle "Do as I do." And yet one can still encounter in Air Force units and subunits officers in leadership positions who do not always organize flight operations shifts in a well thought-out manner, who fail to observe the procedures prescribed by documents dealing with these important matters, who fail to make use of the advanced know-how of those who are successfully accomplishing their assigned tasks, and who inefficiently utilize training time and facilities in the interests of increasing the air, weapons, and tactical proficiency of every aircrew and airman. And yet these are the elements which form the foundation of a high degree of combat readiness and flight safety. Special attention should be focused on these officers. It is not enough to point out to them in a timely manner any errors of omission in performance of their job duties; it is important to give substantiated, specific recommendations on correcting deficiencies and to specify a timetable for accomplishing this. One should not feel shy about speaking frankly and openly to an officer about his mistakes and errors of omission in performing his duties.

A high degree of party-mindedness, an innovative approach, and a scientifically substantiated analysis in evaluating one's subordinates -- these are the principal requirements imposed on every commander and superior officer in preparing efficiency reports. Today high demands are also imposed on officer-leaders. Comrade M. S. Gorbachev mentioned this in a speech. "Today," he emphasized, "it is extremely important that we have the ability to act, as Lenin taught, 'by the force of authority, the force of energy, greater experience, greater versatility, and greater talent.' There should be fewer words, assurances and promises, and more actual deeds, practical results, responsibility and integrity, teamwork, attentiveness toward others, and personal modesty -- this is the principal measure in evaluating all cadres,



their moral fiber and competence, the essence of party demands on work style and methods."

This point should form the basis for all commanders and superior officers, party organizations and personnel agencies in preparing efficiency reports on officer personnel, an activity which has now entered a crucial period. An aggregate of measures pertaining to working with the subjects of efficiency reports has now been completed in Air Force units and subunits. The process of preparing efficiency reports is proceeding well in the outfits in which personnel agencies are headed by officers V. Samsonov, G. Zharkov, V. Stolbov, G. Nemchinov, and V. Kolpakov.

Verification of progress in the process of preparing efficiency reports, however, could also reveal deficiencies. The number of personal interviews on career advancement, improving political, professional, moral-combat and ethical qualities, job-related training, work style and methods with subjects of efficiency reports as specified by the USSR Minister of Defense were not held in all units during the preparatory period; the requisite advice and recommendations have been given for correcting deficiencies and improving personal preparation and the state of affairs in the assigned job area.

In some places specialized facilities have not yet been set up, at which one could become acquainted with documents pertaining to officers' service and with progress in the preparation of efficiency reports in the unit and subunit.

An entire aggregate of matters connected with the process of preparing efficiency reports is being discussed in party and Komsomol organizations, at gatherings of leader personnel, and at meetings of officers. A special role in this important campaign in the affairs of our Air Force is played by political agencies, party organizations, party committees, and party buros. They are taking most active part in the efficiency report process and are directing the entire effort to achieve further increase in the combat readiness of Air Force units and subunits and a radical reorientation of the work style of aviation engineer service and rear services subunit commanders, staffs, and personnel. Considerable attention is being devoted to strengthening military discipline, mastering new aircraft, improving flight safety, training and indoctrination of officer cadres.

Their task includes ensuring a vanguard role by Communists and Komsomol members in qualitative fulfillment of combat and political training plans, maintaining the efficiency report preparation process under party oversight, preventing prejudicial treatment and lack of objectivity in evaluating officers as well as embellishment of achieved results, and promptly responding to any negative phenomena revealed in the process of preparing an efficiency report.

During the most recent period of preparation of efficiency reports there occurred instances where efficiency reports contained favorable recommendations for promotion of officers who were undeserving of promotion and who were soon relieved of their current duties, while some were

recommended for discharge into the reserves. They included officers Demendeyev, A. Lavrinchuk, Ye. Kunavin, A. Vakulenko, and Ye. Belousov.

In some units officers recommended for promotion remained in their present positions, although deserving promotion based on age, experience, level of education, or job training. This was the case, for example, with the Pilot-Expert Marksman Col V. Borshch, who had been recommended for promotion. Unfortunately such instances are not isolated. This practice has been condemned. It does great harm to indoctrination of military cadres and causes resentment and loss of confidence in the officers involved. There should be a particularly resolute effort to prevent the occurrence of cases where undeserving individuals are advanced through favoritism and personal connections.

There have occurred instances where an undesirable officer guilty of errors of omission and breaches of military discipline has been gotten rid of by promotion or transfer to another unit.

It is very important to keep a constant eye on implementation of recommendations contained in efficiency reports, to help officers correct noted shortcomings as quickly as possible, and to draw up a plan for their future utilization.

The process of preparing efficiency reports has entered the concluding phase. Commanders, superior officers, and personnel agency officers must aggressively utilize the time remaining in order to improve the quality of training officer cadres, to raise their level of professional expertise, ideological maturity, as well as to accomplish uniting of military collectives and further increase in the combat potential of their Air Force.

One should also have a clear grasp and understanding of the following important point: the job should not be considered completed when the period of preparing efficiency reports comes to an end; the work should continue. To be done includes making a thorough analysis, summarizing results, and immediately, without postponing things, proceeding with implementation of conclusions of the efficiency report boards in light of the instructions of the 27th CPSU Congress and the requirements of the USSR Minister of Defense. This is a very important job. It also determines in large measure the quality of accomplishment of intensive combat and political training schedules of the current training year -- the year of the 27th CPSU Congress.

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CSO: 9144/382

#### FIGHTER-BOMBER REGIMENT SENIOR NAVIGATOR PRAISED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 12-13

[Article, published under the heading "Aviation Dynasties Serving the Homeland," by Maj A. Yudin: "Passed Down by Their Fathers"]

[Text] As they waited for their own departure time to approach, the squadron's pilots were gathered in a classroom. They listened intently to communications traffic coming over a loudspeaker.

"Lieutenant Colonel Khoroshev has left for the range," Capt A. Golovin said to me.

Listening to Khoroshev's radioed reports, the combat pilots commented on his performance. And one could clearly see a mental picture of the fighter-bomber over the range, speeding to the attack, bright exhaust flame erupting under the aircraft's wing, and the fired missile scoring an accurate hit on the target. Then, breaking away from the target, Khoroshev proceeded to fly a run from a different direction. On this pass he shot up the target with precise cannon fire. The officer reported back to the command post everything he did in the air. From time to time his cheerful, confident voice boomed out from the loudspeaker. "Nicely done," commented Captain Golovin. "What can you say -- it's Khoroshev! He has a good feel for his aircraft and flies it with great skill...."

This was my indirect introduction to the regiment's senior navigator, Military Pilot-Expert Marksman Lt Col V. Khoroshev. Some time later we met again there in the classroom, and I was pleased at the officer's firm handshake. Vladimir Nikolayevich is stocky, of medium stature. He is a man of open countenance, with lively hazel eyes. His movements are calm and measured. He speaks in a low voice, clearly enunciating each word.

Lieutenant Colonel Khoroshev related to me how he organized classes in navigation and how he performed the duties of flight operations officer at the airfield or at the range. He frequently flies as an instructor. When he is doing the flying, he endeavors to wring out of the aircraft everything it is capable of doing and to boost his proficiency to an even higher level.

"After all, in order to teach others," he said, "you have to maintain it, just as in athletics, constantly practicing and tirelessly honing your skills."

...It is hard to say when Vladimir Nikolayevich was bit by the flycatcher. That age-old question a boy asks: "Whose example shall I follow?" is usually answered quite simply: that of one's father. Even if a son chooses a different profession, he nevertheless will be guided in life by the moral principles instilled by his parents and endeavor in all things to do as they would do.

Khoroshev does not remember his father. From his mother he learned that he had been a pilot and had been killed during the first days of the Great Patriotic War, not knowing that they had born a son. All that was left was a photograph and yellow triangular pieces of paper -- letters from the front. On many occasions Vladimir saw his mother spend sleepless nights reading them over and crying. He would go to her and try to console her.

Years passed. In her heart Galina Aleksandrovna sensed that her son was lacking a father's words and counsel. Could they perhaps be replaced to some extent by acquaintance with the actions and deeds of relatives and loved ones? When her son graduated from school and was about to set out on his own path, she took him to the Battle of Stalingrad Museum and told him about her grandfather, whose Order of the Red Banner and map case were on exhibit in one of the museum rooms.

In 1918 Ivan Klimovich Khoroshev was elected member of the Executive Committee of the Tsaritsyn Soviet of Worker, Soldier, Peasant, and Communist Deputies. Soon thereafter he was named commissar of a Red Army regiment which distinguished itself in combat at Tsaritsyn. Subsequently a street in this city was named after this Civil War hero.

His mother's stories and what he saw at the museum made a powerful impression on the young lad. From that time forward he tried to find out as much as possible about his grandfather's life and his father's fate.

Vladimir first enrolled in an aviation secondary technical school. After graduation he took employment at an aircraft plant setting and adjusting complex aircraft systems and became a section foreman. At the same time he was taking training at a flying club. Khoroshev's hardworking nature and purposefulness were noted by his fellow workers and in the factory organization. The plant administration offered him the position of engineering process engineer, and his flying club offered to send him to a military school for pilots. The young man found himself at a crossroads, as it were.

It is naturally flattering to be a fairly high-ranking production supervisor at the age of slightly over 20. And military service would require that he start over from zero, as it were. But Vladimir had never forgotten his mother's tears -- the tears of a widow of a fighting man killed in action -- and the decision to follow in the footsteps of his grandfather and father began to form in his mind. At that time radio, television, and the newspapers were reporting every day that the world was troubled, that imperialism was



preparing for another war. And he chose as a career that which he realized at the time was the most needed at that moment by our country and our people -- the profession of military pilot.

Upon reporting to his duty assignment after graduating from service school, Lieutenant Khoroshev proceeded to master the art of flying with his characteristic stick-to-itiveness. He accomplished a great deal in a short period of time: he became a proficient combat pilot and acquired the requisite knowledge and experience. This young officer was totally dedicated to his difficult job.

Vladimir Nikolayevich flew a great many training sorties into the boundless expanses of the Fifth Ocean, logging more than 2,000 hours aloft and flying dozens of bombing runs, missile and gunfire passes involving complex maneuvers. During his years in the service he mastered aircraft of many types and achieved the highest proficiency rating, becoming a military pilot-expert marksman. Purposefulness and the ability to surmount difficulties are a distinguishing trait of Lt Col V. Khoroshev. And he teaches this to his subordinates. A great many people are grateful to him for his instruction, including officer V. Kuvshinov. At first things did not go so well for him. The older comrades worked long hours with him, but progress was slow. This officer began losing faith in his ability and was entertaining doubts as to whether he had made a correct career choice. The question of grounding him arose. Who knows how all this would have ended if Khoroshev had not been on the spot? Vladimir Nikolayevich helped the young officer surmount the psychological obstacle and taught him not to give up in the face of difficulties but to work toward the stated goal. At the same time the veteran pilot shared with the lieutenant the secrets of expert skill and gave practical advice on flying technique. And results were soon in evidence. Today Kuvshinov is an experienced pilot and has a good reputation with the unit command authorities.

The busy days of intensive training took a great deal of time and energy. But Vladimir Nikolayevich did not become immersed solely within the narrow round of his job duties. He had long been bothered by a question: what had happened to his father? How had he died? Whenever he attended get-togethers with veterans of the Great Patriotic War, he would ask whether anybody had known his father. He sent written inquiries to various archives and other establishments. Long years of inquiry had proven fruitless. But finally he received a reply from the Central Archives of the USSR Ministry of Defense. He was informed that Nikolay Ivanovich Khoroshev had been killed in action at Kursk. The document also indicated his interment site.

During the celebration of the 40th anniversary of the Great Victory, the son visited the site where his father had died, visited his grave, and met with people who had fought alongside him. Standing there by the grave, he thought back across his career, his accomplishments and deeds. Vladimir Nikolayevich had a warm feeling in his heart, both from the awareness of duty performed and from the thought that his son Konstantin had chosen to follow in his footsteps. Thus the military dynasty of the Khoroshevs is continuing on....

After talking with Lieutenant Colonel Khoroshev, I repeatedly asked myself: "What could Vladimir Nikolayevich have become if he had chosen a different career?" And I would always reach the conclusion that whatever post he held, he would remain a genuine Communist, a person with a strong sense of duty.

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## BROADLY-KNOWLEDGEABLE AIRCRAFT MAINTENANCE PERSONNEL PINPOINT MALFUNCTIONS FASTER

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 12-13

[Article, published under the heading "For a High Degree of Flying Efficiency and Flight Safety," by Sr Lt M. Borisov: "Out of One's Military Occupational Specialty"]

[Text] The range, on which the bomber crew would be instrument bombing, was drawing closer. The aircraft commander soon determined on the basis of prominent terrain features that the aircraft had drifted off course. He took over the controls and put the aircraft back on a target heading. If the aircraft commander had not noticed the deviation in time, mission performance would have suffered.

Seeking to determine the cause of the problem, bombsight and navigation systems maintenance group chief Sr Lt V. Zhirnyakov analyzed in detail the aircrew's operating procedures with the flight deck equipment. They were flawless. He then checked the operation of the entire system. Output parameters also proved to be right on the money. And yet a problem had occurred! Something had to be wrong. Finally the officer was able to determine with the aid of the flight data recorder tapes that the problem had been caused by an alternator malfunction, due to poor work by aircraft equipment maintenance group personnel. It is noteworthy that Senior Lieutenant Zhirnyakov had found an equipment malfunction out of his own area of maintenance expertise.

Zhirnyakov reported his findings to the chief of the aircraft equipment maintenance group, officer V. Gasperskiy. Inspecting the alternator, the latter saw that the lieutenant was right. They replaced the unit. A check flight was uneventful.

The specialist personnel of the bombsight and navigation systems maintenance group led by Senior Lieutenant Zhirnyakov do high-quality, prompt work on aircraft equipment, quickly pinpointing and correcting problems. This enables the men to keep the equipment continuously in proper working order and successfully to accomplish combat training missions. They are helped in this

by thorough knowledge of the aircraft and of the interaction among all a modern aircraft's systems and equipment.

It is sometimes difficult correctly to evaluate the state of onboard systems without knowledge of their interrelationships. A combat jet's systems are functionally interrelated. At times it is not easy to delineate the boundary between one system and another. Therefore one can well understand the need for thorough analysis of the operation of the various components of the overall aircraft system. Comprehensively evaluating its state and condition means considering all factors affecting the operation of complex aircraft equipment, and there are many such factors. They include the quality of preflight preparation of the equipment, the aircrew's actions and procedures while aloft, and functioning of the equipment. It is essential to take everything into account, and particularly the physical processes which affect related equipment.

Senior Lieutenant Zhirnyakov, for example, began his analysis of the malfunction with studying the aircrew's actions and procedures while aloft, in order to reconstruct the overall dynamics of the flight: what were the flight conditions, in what modes and conditions was the equipment operating, and at what phase did the malfunction occur? It sometimes happens that problems in aircraft systems occur due to incorrect in-flight cockpit procedures. This may be caused by insufficient pilot practice on the simulator. I remember on one sortie a young pilot was unable to use his weapons in automatic mode. It was later ascertained that he had not switched his weapons aiming and navigation system to operating mode. This was the reason for the "malfunction." For this reason Zhirnyakov was so meticulous about questioning the crew members about their in-flight procedures.

I should state that flight personnel are very helpful to the group chief in analyzing a given malfunction. Relating in detail their procedures during individual phases of a mission, experienced combat airmen recreate a picture which enables the group chief to detect and trace malfunction symptoms and consequences. Frequently aircrews themselves correctly determine the cause of an aircraft system malfunction. All this not only helps the maintenance specialist more quickly find and correct the malfunction but also improves the airmen's technical proficiency.

A mandatory condition for objective analysis of a system's operating condition is careful, precise testing. Testing is performed by all members of the maintenance group. They check not only system operation but also the quality of preflight readying of the aircraft. There is always the possibility that one of the technicians could have made an error. In such instances additional practice sessions are held with them, ascertaining and filling in gaps in their specialized knowledge and skills.

When evaluating the system's operating condition, Sr lt V. Zhirnyakov and his men always turn to their test equipment. Frequently a malfunction can be pinpointed only by an oscilloscope waveform. On one training sortie, for example, it seemed that all aiming procedures had been flawlessly followed. The bomb should have scored an accurate hit on the target. But it was a miss.



Specialist personnel ascertained from the tapes that the miss was due to an error by the pilot in operating his bombsight and navigation system.

Senior Lieutenant Zhirnyakov attaches great importance to comprehensive improvement in his men's job proficiency. He is convinced that it is impossible to master an occupational specialty without studying the complex processes taking place in aircraft systems and their interlinkages. Therefore, in addition to deepening the knowledge of the men of the bombsight and navigation systems group, this officer holds special training classes with them. Veteran specialists in avionics, aircraft equipment, and armament are asked to these classes. They discuss the operation of their systems in combination with the bombsight and navigation system. The airmen study technical information sheets on equipment failures and malfunctions and receive recommendations on aircraft servicing and maintenance. All this is an essential condition for knowledgeable operation and conscientious servicing and maintenance of modern aircraft equipment.

The bombsight and navigation equipment maintenance group chief sees as one of the main tasks that of ensuring that aircraft equipment is always in good working order and in a state of combat readiness, and not only in his own occupational specialty. The experience of this vanguard specialist indicates that prevention of malfunctions will be most effective with a comprehensive analysis of the operation and functioning of all the subsystems and equipment of the modern aircraft.

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CSO: 9144/382

## AIR FORCE HELICOPTER CREWS HELP FIGHT CHERNOBYL DISASTER

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jan 86) pp 14-15

[Article, published under the heading "Heroes Among Us"; "Helicopters Over the Reactor"]

[Text] During the night helicopter regiment aircrews were aroused by an alert. Instructed to redeploy to the closest airfield to Chernobyl, party member regimental commander Gds Col A. Serebryakov was the first into the air. Other crews took off behind his helicopter into the solid-overcast sky. The crew members realized that this was not an exercise, that something had happened at the nuclear power station and that their help was urgently needed.

Party member Col B. Nesterov, deputy commander of the air forces of the Military District, who had already arrived at the redeployment airfield, organized reception of the arriving helicopters, billeting of personnel, and provision of all necessary supplies and services. After all this was accomplished, however, there was no time for rest. Early that morning Cols B. Nesterov and A. Serebryakov took off for Chernobyl.

After landing at the stadium, the officers proceeded to the municipal party committee, where a government commission was operating. Here they were briefed on the disaster at the nuclear power station and were assigned the task of inspecting the power station from the air, determining the extent of the damage, and determining avenues of approach for the firefighters.

As they approached the reactor building, they spotted the disaster scene: the roof had collapsed, forming a crater filled with crumpled metal structural elements, with flames raging along the edges of the crater. Pilots flew several passes over the reactor, photographed the area of the power station, determined prominent landmarks, and landed on a flowerbed by the building housing the city committee.

The helicopter flew several more runs to the site, carrying experts and officials, in order to work out the most correct solution. The decision was made to fill the crater with sandbags and special materials. It would take a great many sandbags.... It would be a job of vast proportions.

They were selected several kilometers from the power station for running helicopter operations, for landing and loading them. But this was not the object of the matter. A method had to be devised for dropping the sand. Col. A. Serebryakov was the first to fly a sand run. Several crewmen were hoisted on board. After they were airborne, the crew designated preliminary reference points for lining up their approach to the disaster scene. They must determine an optimal height above ground level to drop their load. The helicopter proceeded to hover at 200 meters. Pilot-navigator Gds Lt. A. Mikhlin dropped a bag. Direct hit. They flew another pass. Another direct hit. Squadron commander Gds Lt Col Yu. Yakovlev with Col B. Nesterov made the second sand run. This drop was also successful.

A question arose at this point: how could they maximally utilize a helicopter's payload capacity and ensure a continuous movement of sand to the reactor? It had become obvious that precise air traffic control was essential.

Colonel Nesterov assumed the job of air traffic control and target designation. Following several sorties by the crews of Guards Colonel Nesterov and Lieutenant Colonel Yakovlev, optimal altitude and airspeed on approach to the reactor were determined, as well as position check drop reference points and safe spacing between helicopters on the target approach run.

As is usually the case, the extreme conditions of this emergency situation tested what people were made of. On this occasion pilots and technicians fully displayed their ability and intelligence. They suggested and tested several different variations of efficient helicopter loading and methods of dropping the load. Each man thought only about how more effectively to accomplish the critical task.

Helicopter crews worked throughout the day at the base airfield, with frequent pauses to fuel the helicopters and perform radiological decontamination. The following morning they again took to the air. As customary, the first one was a weather reconnaissance pilot, with the mission of determining cloud cover level, wind direction and velocity, and optimal avenues of approach to the site. The airlift then resumed. Mi-8, Mi-6, and Mi-26 helicopters lined up at the power station in a continuous chain. And only after darkness fell did the giant "carousel" come to a halt, to start up again following a brief pause.

On the third day, helicopter crews radioed that the flames had been extinguished. But the flights continued. Relief aircrews would take over and, after being briefed on their assignment, would immediately proceed to the disaster site. Preliminaries did not take more than an hour. The unique helicopter operation continued.

During these days of feverish activity helicopter crewmen performed radiological reconnaissance, aerial photography, monitored road traffic, and performed various assignments which had never been done before. For example, in order to measure temperature at the reactor, it was necessary to place precariously into the center of the crater a thermocouple suspended on a very thin cable. Officer N. Volkov successfully accomplished this task. His

helicopter was given heading corrections by officer O. Chuchko in another helicopter, while flight operations controller Col V. Sobolev provided altitude and range corrections. The helicopter hovered above the crater. The device was lowered precisely into the center of the reactor, and specialist personnel took readings.

As we know, pioneers always have a difficult time of it, for they are traveling an untrodden path and encounter many unexpected events, which at times are impossible to foresee. It is easier for those who come after them, because one can take into account all shortcomings and adopt all useful things done by the trailblazers. There were no routine sorties here. Each involved danger. But our pilots gave no thought to this. They performed their job with honesty and integrity.

Nevertheless pioneers are pioneers. The entire responsibility for and complexity of the first flights to combat the consequences of the accident at the nuclear power station lay on the shoulders of officers B. Nesterov, A. Serebryakov, Yu. Yakovlev, and K. Dubinin, pilot-navigators Gds Maj S. Nikitin, Gds Sr Lts V. Balakhonov and V. Pereskokov, flight technicians Gds Sr Lt V. Onimekh and Gds Lt S. Telegin, as well as many other Air Force specialist personnel. They displayed an example of selfless actions and led others by example.

There have been a great many examples in the history of Soviet aviation where Soviet pilots have come to the aid of persons in distress on land and sea, have helped rebuild various facilities destroyed in natural disasters, and have selflessly labored where other equipment could not be used. Helicopter crews are ably carrying out their internationalist duty in the Democratic Republic of Afghanistan, helping a brother people build a better future. The events at the Chernobyl Nuclear Power Station were another severe test of our airmen's morale and of the reliability of our aircraft. They passed this test with flying colors.

What gauge can be used to measure the breadth of the human soul, the limits of nobility, courage and fearlessness, the depth of the wellsprings of ethics and morality? What criteria can be used to assess the degree of ideological maturity and conviction of our pilots, who boldly strode into danger? Their actions and deeds became such a measuring stick. The fact that our air warriors proceeded to carry out a difficult and hazardous undertaking without fear or doubt, acting as one, is a logical phenomenon of Soviet life, an integral feature of our way of life. Indoctrinated in a spirit of selfless devotion to the homeland and the Communist Party, they are ready and willing at all times to defend with their own lives the prosperity and happiness of their people, to lend them assistance at a difficult time.

And regardless of the selfrighteous raging of the bourgeoisie, screaming and raising a hue and cry over the Chernobyl accident, Soviet citizens know full well that they are using this to conceal an unchecked arms race, including nuclear arms, and ignoring of Soviet peace initiatives. This entire propaganda campaign furthers the interests of big capital, the interests of the merchants of death, who reap vast superprofits from the manufacture and



kind of weapons. They care not a whit about the fate of mankind, and certainly not about the fate of our people.

Soviet helicopter crews have proven once again that if what is at stake is the lives of our people, the happiness and prosperity of the homeland, they are ready and willing to take the most selfless actions.

REFERENCE: "Aviatsiya i kosmonavtika", 1986.

REF ID: A144/382

## OPERATION, FEATURES OF NONPROGRAMMABLE ELECTRONIC CALCULATORS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 16-17

[Article, published under the heading "The Pilot and the Computer," by Cols A. Andreyev and V. Rubin: "Design and Input Language of Nonprogrammable Microcalculators"]

[Text] Computers have solidly assumed a place in military life and combat activities. They help automate aircraft, aircraft weapons equipment control processes, and they are used in troop command and control, monitoring of crew actions, monitoring equipment status and condition, as well as many other processes. "...Solid knowledge and ability to use computer hardware by officer personnel," stated USSR Minister of Defense MSU S. L. Sokolov, "is becoming an important factor in increasing Armed Forces combat readiness."

Microcomputers and electronic calculators are indispensable in readying aircrews for flight operations and in simulating combat operations. Experience indicates, however, that their effective utilization requires certain knowledge and skills. The editors have received a great many letters in which pilots and navigators submit programs they have developed for solving specific problems. These solutions are not always simple in use and employ various arrays of interactive input statements.

In order to obtain orderly regulation of the employment of microcomputers and electronic calculators in flight operations and to develop in flight personnel a taste for an interesting and useful activity, the editors will be publishing materials under the heading "The Pilot and the Computer." These articles will discuss the basic design, keyboard input procedures and computational principles employed with nonprogrammable and programmable microcalculators.

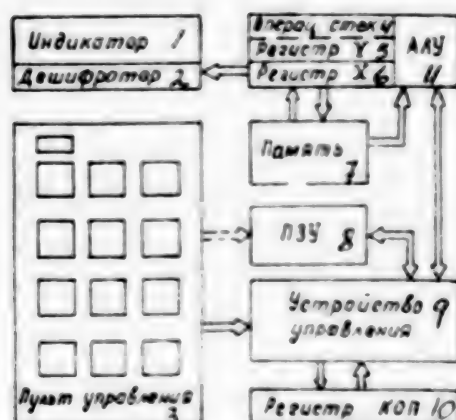
This series of articles, under the editorial supervision of Professor and Doctor of Technical Sciences Col V. Mamoshin, as well as the standardized problems, will unquestionably help Air Force personnel improve the quality of preparation for flight operations and performance of complex combat training missions.

Electronic calculators which automatically perform operations on numbers (operands) only on the basis of keyboard-entered commands are called

nonprogrammable calculators. The simplest of these calculators perform only arithmetic operations and offer certain elementary functions. Nonprogrammable slide-rule calculators, which perform not only arithmetic operations but which also calculate mathematical functions and specific-purpose functions frequently encountered in calculations, are more convenient, however, for specialized technical, engineering, and operational-tactical calculations.

Electronic calculators are complex devices which contain from several thousand to several tens of thousands and even hundreds of thousands of transistors in integrated circuits (large-scale integration integrated circuit -- LSI IC). An LSI IC is generally a rectangular silicon chip 3-5 millimeters on the side, on the surface of which dozens of integrated circuits are stamped, as it were (etched), in the process of several hundred operations performed on an automated production line. As a result IC chips, and therefore calculators based on these chips, are comparatively inexpensive and reliable.

However, one need not necessarily study the design or circuitry of electronic calculators. It is sufficient merely to have a clear notion of the relationship between pressing a key and its consequences. The following block diagram shows the interlinkage among the principal components -- keypad, display, processor, memory, read-only memory (ROM), and control unit.



Key: 1. Display; 2. Decoder; 3. Keypad; 4. Stack; 5. Y register; 6. X register; 7. Memory; 8. ROM; 9. Control unit; 10. Operation register; 11. Arithmetic and logic unit

The sole means of entering information in electronic calculators is a keypad with input keys and toggle-type keys and switches. Pressing keys generates coded electrical signals which control the calculator's operations; command symbols are indicated on the keys and determine actions -- operators, pertaining to several basic groups: number input; functional single-number,

two-number, and sometimes multinumber operations; memory access, and computation control.

Since an electronic calculator, just as any computer, operates only with numbers, the machine "understands" such a message as an operation only if it has been encoded by a specific number, called the operation code or operator code. We should note that those operations in which a function of some one number is calculated (determination of square root, calculation of trigonometric functions, etc) are categorized as single-number operations. The arithmetic operations of addition and subtraction, multiplication and division are two-number operations, since each operation is performed on two numbers.

In order to reduce the total number of keys, on some calculators some of the operators of built-in functions are indicated above or below the keys; to enter them, one must first press the so-called prefix-operator key, usually designated with the symbol F. Thus if one presses a key, only the operation indicated on that key will be executed. If one first presses the prefix key and then any other key, the operation indicated above (below) the key will be executed (function calculated). One should bear in mind that pressing the F key affects only one operation, the key of which is pressed immediately following the F key.

The display provides visual information in the form of decimal representations of numbers plus certain symbols characterizing calculator operating mode. It contains a number of digit positions, one or two of which are used to display the minus sign and auxiliary symbols, with the remainder displaying the digits of decimal numbers. Each digital position usually contains seven or more LED, liquid-crystal, or gas plasma digital display elements. The required digit displays when voltage is applied to a specific combination of these elements.

Most calculator displays can display numbers in two forms: with a fixed decimal point separating the integer from the decimal fraction: 15.4; 0.425; -123.4; 0.001; 534.125, and floating-point, that is, in the form of a mantissa multiplied by an exponential function:  $0.194 \times 10^{\text{sq.}}$ ;  $0.0194 \times 10^{\text{cu.}}$ ;  $42.5 \times 10^{\text{to the minus 2}}$ , etc.

A decimal-system exponent is a whole number and is called a power. The power determines how many places to the right (+) or to the left (-) the decimal point in the mantissa should be shifted when converting to a fixed-point number. The power of a number on the calculator display is indicated by two digits at the extreme right preceded by a symbol ("+" is not displayed). Everything to the left is the mantissa; the exponent is entered by a special operator.

By using floating-point notation, electronic calculators can operate across a very broad range of values -- from 10 to the minus 99th power to 10 to the 99th power.

The microprocessor is the heart of the electronic calculator, which determines the capabilities of a specific calculator model. It contains the arithmetic and logic unit (ALU), which performs operations on operands coded at the



machine-language level, and a number of registers, used to store in binary form operands, results, and operation codes in the process of computations. Nonprogrammable calculators usually have two or more operation registers as well as an operation code register. Operation registers store operands and operation results, while the type of operation to be performed is determined in the operation code register.

A control unit, which coordinates the operation of all calculator components, is incorporated together with the processor.

Read-only memory (ROM) is used to store constants ( $\pi$ ,  $e$ ), operation execution programs, and programs for computing standard library functions permanently stored in the calculator.

The microprocessor input (output) register, called the display register or X register, is connected to the display via a decoder, which converts the code of a number stored in the X register into voltages which are applied to the display shift elements, which results in display of the decimal representation of this number. If a number is being displayed, this means that it is contained in the X register.

Since arithmetic operations can be performed only on two numbers, the ALU of any electronic calculator, in addition to an X register, also contains a Y register, which stores the second operand during execution of two-number operations. Some calculator models also have additional registers, which are interconnected in such a manner that the contents of each is transferred to another register on a special signal. This kind of connecting of memory registers is called a stack.

The pushdown stack "up arrow" operator or the result output "=" operator performs auxiliary operations on the contents of the stack. The "X $\leftrightarrow$ Y" operator performs the auxiliary operation of exchanging the contents of the X and Y registers. Operators designated for electronic calculators by various symbols: CX, CL or CIX, clear the X register, while operators C and CL clear all  $\Delta$  registers.

The accumulator registers of a nonprogrammable electronic calculator (generally three to three) are used to receive and store input data and intermediate computation results.

There are general registers and addressable registers. General registers perform two-number operations on the contents of the X registers and memory, with the computation result transferred into a memory register. They are controlled by keys bearing the symbols P+, P-, Px, P+X sq, and M. As a rule such calculators also have a memory clear operator -- SP or CIM.

In calculators with addressable registers, after keying the store to memory operator, usually designated by the symbols ZP, P, X $\rightarrow$ M, X $\rightarrow$ P, or STO, the number of the memory register to be used, that is, its address, is indicated. A similar procedure is used to transfer information from a memory register into the X register. To accomplish this, after entering the call from memory

operator, designated by the symbols IP, P→X, M→X or FC, and the number of the memory register in which the information was stored.

Now, after explaining the purpose and principles of operation of the elements of the electronic calculator, we shall examine the language representing information in the calculator, that is, the calculator input language."

The input language of an electronic calculator (just as any natural language) comprises a set of symbols as well as the rules which specify how they can be performed with the aid of these symbols and how input should be organized. It is characterized by an alphabet formed of a set of symbols located on the calculator keypad, a vocabulary formed of allowable and semantically (related to meaning) indivisible combinations of alphabet elements -- input-language words or operators, as well as grammar, which encompasses lexical rules, word formation and syntactic rules which determine word sequences, or sentences, which lead to a result possessing independent meaning, or a statement, while one or several statements form a computation program.

In calculator input languages operands (numbers on which operations are performed) and operators, which control the execution of operations, correspond to nouns and verbs of natural languages. Input of operands in calculations is also accomplished with the aid of the keypad, therefore operators serve as input-language words.

Calculator input languages are conditionally classified into four types on the basis of a calculator's purpose, mode of data entry, and sequence of operations in solving problems: natural algebraic, syntax without parentheses, with algebraic logic and simple parentheses syntax; with limited hierarchy of operations, and simple parentheses syntax; with inverse logic, program text, or inverse syntax without parentheses.

Characteristic of calculators with syntax lacking parentheses is that numbers and arithmetic operations are entered according to operator priority. For example, when calculating the expression  $(3 \times 4) - 5$ , the two multiplications are performed, followed by the subtraction. The calculator memory is used for temporary storage of intermediate results.

In a calculator with algebraic logic and simple parentheses, parentheses, entering opening and closing parentheses, can control the sequence of operations. For example, in calculating the expression  $(3 \times 4) - 5$ , it is not need to use the calculator's memory.

In a calculator with algebraic logic, hierarchy of operations and parentheses, multiplication and division operations are performed first, with the operations of addition and subtraction performed subsequently. For example, when calculating the expression  $4 \times 5 + 8 \times 2$ , we press the keys of a calculator with algebraic logic and hierarchy of operations in the following sequence --  $4 \times 5 + 8 \times 2$ , the result is displayed; a calculator with algebraic logic without hierarchy of operations will display 56 as a result.

We should note that hierarchy of operations is accomplished with the aid of stack registers, the total number of which is limited and is determined by the calculator's design. For example, the capacity of the MK-41's stack registers provides capability to store as many as 8 intermediate results and as many as 7 operations.

Thus the area of application of the above-described types of languages has considerable limitations. For the first type they are due to the necessity of evaluating priority of operations in the calculation process and using the calculator's memory to store intermediate results. It is easier to perform calculations on a calculator employing the second type of language. This type also, however, requires additional pressing of keys for entering opening and closing parentheses.

The third type of input language is the most sophisticated, although it too has limitations, since a substantial increase in the number of stack registers, which make it possible to store operands and operations, leads to increasing complexity of calculator design and does not fully eliminate the use of parenthesis operators.

All these shortcomings dictated the development of a more sophisticated no-parentheses input language. Such a language was developed by Polish mathematician A. Lukaszewicz and was given the name inverse entry of arithmetic expressions or entry with reverse syntax. One peculiarity of this language is the fact that all two-number operations are equivalent, while arithmetic operation signs are placed not between operands but after them. For example, if we wish to perform a calculation involving the formulas

$$a \times b + c \times d \text{ and } \ln(x + \sqrt{yz - \sin u}),$$

the sequence of pressing the calculator keys should be as follows:

|a|b|x|c|d|x|+|, |y|z|x|u|sin|-|√|x|+|ln|.

As we see, the operation sign is placed after the operands and refers to the last two numbers in two-number operations or to the last operand when executing a single-number operation.

Thus differences in using pocket or desktop electronic calculators of various types involve primarily the syntactic peculiarities of their input languages and the corresponding stack register operation procedures. Therefore the user, before performing calculations, should thoroughly study the specific procedures for his calculator. (To be continued)

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## PILOTS' ENTHUSIASM FOR FLYING SHOULD BE FOSTERED AND ENCOURAGED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 1 Jun 86) pp 22-23

[Article, published under the heading "Flying and Psychology," by Military Pilot 1st Class Maj Gen Avn A. Sulyanov, member, USSR Writers Union "Returning to Romance"]

[Text] "Romance is that which contains ideas and feelings which emotionally elevate a person.... A romantic is a person who is imbued with romance and lofty emotions" -- this definition can be found in S. I. Ozhegov's dictionary of the Russian language. The word "romance" has always been very popular in aviation. V. Chkalov, M. Gromov, A. Serov, A. Pokryshkin, A. Fedotov, G. Beregovoy, and many other well-known and little-known aviators have spoken of the romance of flying. Particular attention was devoted to romance in the 1930's and 1940's.

The term was mentioned with less frequency with the appearance of jet aircraft. What happened? Why has the spirit of romance in aviation gradually disappeared from official documents, from newspapers, magazines, books, literature, and from the movies? Is it that our famed aviation no longer has need of it?

Today one can frequently hear approximately the following: "What kind of romance can there be in the age of supersonic speeds and protracted G-limits? After a few times up you think of nothing but rest and quiet." But was it really easier to fly in earlier days? I feel that the opinion that romance in aviation has disappeared is totally false and far from harmless. It existed in aviation in the past, it exists today, and it will continue to exist in the future! The flying profession is permeated with romance and the insatiable need for flight.

I recently received a letter from civil-aviation pilot V. Voznyuk, in which he wrote: "Every flight is an endless joy to me! I am in a fine, elevated mood as I drive to the airport.... After I have taken off and completed climbout, I admire the beauty of the clouds, the light-blue sky, and the sun's bright rays.... You, our instructor, used to tell us: 'Boys, don't ever lose your joy of flying. Don't ever forget the joy of flight....' I remember your words to this very day."



Alexander Vladimirovich Voznyuk was no different from the others, except perhaps in his desire to spend more time in the air. He was totally devoted to flying, dreaming of becoming a fighter pilot. And he achieved his dream. He flew for many years.... Now he flies the Yak-40 passenger aircraft. His hair has long since greyed at the temples, but he is still a romantic. That is wonderful!

I showed a young-ranking Air Force officer about this letter (Voznyuk and I have known each other for many years). After I finished he said with a sigh: "What a pity we could use more such individuals, totally committed to flying, daring and bold...."

It is not only enthusiasm but also the strength of our Soviet people, which always needs courageous, bold people, people ready and willing to do anything. Such individuals can be found among our people, representing its strength and spirit. And our people have seen that people in aviation are courageous, daring and dependable of spirit, who dream about the sky, about distant flights. The Soviet people rightly call aviators romantic.

What prevents us from developing romantics? It would seem that there are plenty of people to be taught and plenty of people to teach them. It is not that simple. There are problems which cannot be solved by simple instructions. What we need is a system, the efforts of many people joined in order to resolve the problem of developing air warriors who are willing to perform any mission regardless of difficulties, remaining loyal to the cause to the end. And naturally we should begin with youth. We need books and literature characterized by romanticism and commitment to dreams. We need exciting, impact-producing books about aviation and its finest achievements, and we need vivid, gripping films and TV movies such as the films "The Fifth Ocean," "Valeriy Chkalov," "Story of a Real Man," "The Great Escape." We need the commitment and efforts of organizations and individuals, especially, writers, journalists, filmmakers, people in TV, and so on. We need support by command authorities and political agencies, as well as a coordinated program coordinated with various agencies.

We need more and closer patronship activity by aviators in our general-education and vocational schools. Young boys with a dream of flying should have mentors, fathers of flying clubs and cadets enrolling in Air Force schools. It is our job to maintain their spirit of romance of the sky and their desire for a flying career. Very important in this regard are get-togethers with young people and pilots, technicians, engineers, veterans of aviation, especially as an introduction to aircraft and achievements of Soviet aviation.

We need to take part in get-togethers with combat veteran pilots and their families. Their interest to their moving stories about the tumultuous war years, their Soviet friendship and mutual assistance, and about the heroic deeds of all those who flew and supported combat air operations. I met together in my regiment with Hero of the Soviet Union A. Aleksey Petrovich related the

combat exploits of Heroes of the Soviet Union A. Chislov, I. Berezutskiy, his wingman S. Petrov, and spoke with particular warmth about the mechanics, who worked in freezing weather and rain to ready aircraft for missions. This was an object lesson for the young commanders and political workers on how one should guide mutual relations in a combat unit for the purpose of achieving the common goal -- victory over the enemy.

Yes, pilots are the instruments of the labor of all ground personnel and the efforts of the entire outfit. The pilot is the designated representative of this outfit; to him has been entrusted the most difficult task -- to engage in battle, to meet the enemy in deadly conflict.

But pilots never had an attitude of exclusivity or constituted a special caste. They saw themselves as a component part of this collective. The mechanism of interrelationships among pilots, maintenance technicians and mechanics at the battlefront has perhaps not been completely investigated. One thing is clear: during the war years the aviation collective possessed truly magical force, which elevated a person, which made him stronger in spirit, bolder and more courageous. The friendly relations among combat soldiers thus constituted a reliable support for fliers in battle, for they knew that at the most difficult moments a fellow soldier would extend a helping hand, and they believed in the reliability of battle-front fraternal unity. The firmer this friendship was, the stronger was the regiment and the higher its level of combat readiness.

We should intensify efforts to unify Air Force collectives and learn from the war veterans the ability to be friends and to knit together strong subunits. This will unquestionably have a positive effect on increasing the combat readiness of Air Force units.

I should like to emphasize one additional point. Today's aircraft are complex, unified systems. They have required increased intellectual ability. Hence the increased demands on pilots' professional and general knowledgeability and level of education. But protracted, stressful flying can significantly affect a person's emotions; in other words the equipment "exerts pressure" on the feelings and senses, and if requisite measures are not taken, we shall with ever increasing frequency encounter individuals with a lesser emotional background, a certain number of robotlike "machines," who do an excellent job of performing operations with buttons and toggle switches. It is precisely here that the spirit of romance in a person should be stimulated by literature, music, painting, art, which "soften" people's "drying-up" emotions, foster the development of thinking in images, and therefore help perform with reliability in a complex emergency situation and extend a pilot's flying career. V. I. Lenin spoke time and again about the enormous significance of art in people's upbringing and indoctrination.

Art and literature are capable of giving to youth a hero of the time of the Great Patriotic War, of today's aviation, a courageous hero devoted to the people, an intrepid individual who loves his job, who is sociable and of unflagging spirits, with a strong sense of collectivism, of an honest and open heart, with the character of a Nikolay Ostrovskiy and Aleksey Maresyev. Our young people and our aviation need such a hero!

The romance of flying is a foundation stone of aviation optimism. A person who possesses this quality, who loves aviation, who is goal-directed, no matter how many obstacles and tribulations he encounters on his journey through life, no matter how many deserved and undeserved offenses, which sometimes cause him to wonder if it is all worth it, surmounts them and becomes stronger and firmer in spirit. Another person, indifferent to aviation (if they give me a plane, I'll fly, if not, I'll do tower duty), becomes weakened and soured in the face of such difficulties, and loses his psychological stability; development of determination, self-control, and boldness is slowed down for quite some time in such an individual.

Optimism is as equally characteristic of aviators as, let us say, the need for solid knowledge of their aircraft and strong physical and emotional health. It is difficult to imagine a pilot without optimism. But optimism does not come spontaneously; it too must be instilled with the aid of literature, films and TV movies, get-togethers with famous aviators, and publicity of combat traditions, courage and fortitude on the part of men of the same regiment during the war years and in peacetime.

A combat glory museum, for example, was established in a certain decorated guards combined unit through the efforts of unit personnel and patrons. It is housed in a two-story building. The museum's very spirit, documents, display models, and the personal effects of heroes have a powerful emotional effect on museum visitors. These include officers newly assigned to duty with the unit. Personnel membership acceptance ceremonies are held here, as well as ceremonies at which party cards are presented to new party members. The spiel by museum guide Hero of the Soviet Union N. Malakhov, a war veteran, and the amazing atmosphere invoked by the exhibit rooms -- all is filled with optimism and romance. Young pilots who have visited the museum state that it increased their desire to fly, put them into high spirits, and impelled them to strive fully to master their complex aircraft.

Of course much, if not all, depends on the people working in propaganda. Lefty feelings and enthusiasm can be toppled back to earth if one's heart and soul are not put into this noble task.

At a certain Air Force garrison officers' club, for example, there is not a single movie on the theme of aviation to be found on the film schedule. Even on a traditional aviation holiday, that day's movie featured musketeers.... This is a staggering example of inertia! And yet it is very important to hold film festivals in the units on the aviation theme, as well as film months devoted to the winged defenders of the homeland. Aviation must be widely and knowledgeably publicized.

I once happened to visit a military hospital on an official matter. At the hospital I encountered by chance a pilot acquaintance whom I had known as a bold, physically-fit combat pilot, an optimist, a romantic, totally dedicated to aviation. My old acquaintance had undergone a radical change: his face was pinched, his movements were languid, there was resentment in his eyes, and he spoke in a subdued voice. He was very preoccupied about something. It seems that they had tried to ground him permanently due to a quite common ailment

which is of little significance in aviation. The same diagnosis had been reached at his previous medical examination, but they had approved him for flight duty. But the next time the new flight surgeon wanted to ground him. Flying was losing an outstanding pilot, athlete, public-spirited activist and... a romantic.

I feel that we should not look at a pilot solely through the prism of medical regulations, for a rigidly-narrow official approach in this matter causes irreparable harm -- aviation is deprived of its most experienced, high-time, highly-trained pilots who are devoted to the skies. Frequently our medical people fail to see a person's soul and approach with professional pedantry, using a single measuring stick, both a person who wants very much to fly, who loves aviation and is dedicated to it, and a person who is indifferent about flying and does not prize the title of pilot. Can one agree with and support doctors who ground a 45-year-old professional, a test pilot who has helped in the development of a dozen modern aircraft, due to an insignificant medical deviation from the norm? And the person in question, who has boldly looked danger in the eye on numerous occasions, an athlete who runs the trails winter and summer, who loves skiing and tennis, hunting and fishing, is trudging dejectedly through the hospital corridors, beseeching the doctors to reexamine him....

I believe it is high time to reexamine certain points of medical regulations pertaining to veteran pilots who have time and again turned in excellent performances, who wish to extend their flying career. The problem of medical examination has for them become a social problem, if you will. Obviously the matter must be resolved at the very highest level. Restoration of the health and extending of the professional career of experienced, the most highly proficient, excellent-performing combat pilots is a genuine necessity in the interests of the combat readiness of our fine Air Force.

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## TOP PERSONNEL URGED TO PASS ON THEIR EXPERIENCE, KNOW-HOW

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 24-25

[Article, published under the heading "Implementing the Decisions of the 27th CPSU Congress": "Experts"]

[Text] "The hardworking nature and ability of Soviet citizens is a determining condition for achieving a stated goal. What is required is skillful organization and precise guidance of this great force. Here as well one can scarcely exaggerate the role of socialist competition. It should be focused on improving work quality, economy and thrift, achievement of stated goals by every workforce and at every work station. Enthusiasm and growing skill have served and, we are confident, will continue to serve in the future as a reliable support in our efforts."

From the Central Committee Political  
Report to the 27th CPSU Congress

Effective accomplishment of the missions assigned to the Air Force urgently demands further improvement in the content, style, forms and methods of work in Air Force units and subunits in light of the decisions of the 27th CPSU Congress. All flight and ground personnel need a new approach to things, a new mode of thinking and a new psychology. Ensuring a vanguard role and personal exemplariness by Communists in performance of party and military duty is an essential condition for strengthening party influence on the daily lives, training and job-related activities of Air Force personnel. It is gratifying that the overwhelming majority of master-rated personnel are Communists. Their expertise, tested and proven time and again in mock aerial combat and in tactical air exercises, has become a standard against which other Air Force personnel measure their performance. Master-rated personnel are blazing trails, by their persistent labor and initiative encouraging their fellow soldiers to reach new levels of achievement.

Tactical control officer Capt A. Sukmanov has gone through the stern school of military proficiency, rendering internationalist assistance to the people of the Democratic Republic of Afghanistan. He has been awarded the Order of the Red Star for his personal courage and exemplary performance of his military

duty. His acquired experience and know-how are helping him in his duties in an excellent fashion. At a recent tactical air exercise, his initiative-filled actions on the part of Capt A. Salimov, in the duties of forward air controller, greatly contributed to the successful performance at the range. The unit's Commandant, inspired by trust and confidence in this vanguard officer, appreciates his contribution to the membership.

Aircraft armament group chief master proficiency-rated Capt. Salimov also proven himself to be a highly technically-knowledgeable, a good organizer, and a skilled indoctrinator of his group. The equipment prepared by the men in this group always performs perfectly.

The squadron commanded by Military Pilot 1st Class Gds Capt. Salimov is constantly seeking reserve potential for achieving more efficient use of the combat capabilities of its modern aircraft and increasing the proficiency of all flight activities. Thanks to excellent training, modern equipment, highly-proficient formation-flying ability, and effective use of the extensive arsenal of modern fighting tactics, the squadron always hit their targets on the first pass in a complex air environment.

WO N. Yermenkin, a veteran of the unit and aircraft engine inspection and maintenance group technician, makes a large contribution to increasing the outfit's combat readiness. He is an experienced and innovative. The instruments and devices he has developed have brought considerable time savings and improve quality of aircraft maintenance. This innovator has enlisted many fellow airmen to technology.

Based on socialist competition results, squadron deputy commander, Military Pilot 1st Class Gds Capt R. Khamidullin, recipient of the Order of the Homeland and the USSR Armed Forces, 3rd Class, and the organization secretary Military Pilot 1st Class Gds Capt. Salimov have been named the Air Force regiment's top specialist personnel. The combat pilots, standing alert duty in two-aircraft elements, Gds Capt. Bovt and S. Volozhanin, successfully carried out the mission. The squadron's commanding officer.

A true expert is always distinguished by genuine openness. The proficiency-rating specialist personnel pass on their experience to their comrades, show them with persuasive examples the high level of professional expertise, and teach them advanced techniques. The experience of the top performers is most prominent in that it is carried on in the deeds of others, and its continuation. This is a guarantee that Air Force personnel will fulfill their ambitious socialist pledges.

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## BOOK ON WORLD WAR II SOVIET FIGHTER PILOTS REVIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 26-27

[Article, published under the heading "New Books," by Lt Gen Avn (Ret) Professor N. Sbytov: "'Getting to Know Oneself in Combat'"]

[Text] The above is the title of a book by three-times Hero of the Soviet Union War Avn A. Pokryshkin ("Poznat' sebya v boyu," Moscow, DOSAAF, 1985, 420 pages, 90 kopecks), on which he worked during the last years of his life. It is dedicated to a complex and important Air Force job -- that of fighter pilot. These are memoirs of a famous Soviet hero, dealing with air combat against the fascists, in which he took part from the very first days of the Great Patriotic War right up to its victorious conclusion in May 1945.

The Soviet Air Force gained air supremacy thanks to coordinated efforts by all air components, including Naval Aviation and air defense aviation. At the same time fighter aviation was a decisive force in defeating the Luftwaffe. In air-to-air engagements and battles our fighter pilots demonstrated their total devotion to the socialist homeland, displaying mass heroism and accomplishing feats the memory of which the Soviet people will preserve forever.

Victory in aerial engagements depended first and foremost on how rapidly fighter pilots learned the complex laws governing air-to-air combat. Pokryshkin reveals in his book the difficult process of development of the fighter pilot in the course of combat operations, his development of courage and valor, hatred toward the invaders, and the fervent desire to achieve total victory over the adversary. In the course of the war Aleksandr Ivanovich advanced from pilot to commanding officer of a fighter division. He demonstrates on the basis of his own experience and that of his comrades in arms how pilots learned to gain knowledge of themselves in battle and tells of the innovative search for new modes and methods of aerial combat and the importance of the ability fully to utilize aircraft weapons.

The author discusses organization of combat operations, training of young pilots, interaction and coordination between air army command authorities and aircraft designers in their efforts to improve aircraft performance capabilities. The author recalls air battles, personally-fought engagements,

victories won, and he tells how hard people took the loss of friends and comrades in arms. He emphasizes that pilots' devotion to their socialist homeland and profound comprehension of their personal responsibility to the people and party for their actions and deeds are of decisive importance in combat against a powerful and crafty adversary.

Aleksandr Ivanovich Pokryshkin persuasively demonstrates how the pilot's professional skill, in combination with his high degree of political awareness, moral and psychological staunchness, helped gain victory over the enemy. The author devotes considerable attention to development of alertness, personal bravery, combat expertise, as well as to aircraft performance characteristics and the importance of foreseeing the adversary's possible moves. Only by possessing a clear awareness of his place on the fighting team is a pilot ready and willing to go to the aid of his comrades and confident at all times that he will be assisted by his fighting comrades.

The author discusses the role of regimental and division commanders as organizers of combat operations and the process by which they assimilate new job duties, especially in the area of indoctrinating and preparing flight personnel for combat and measures to strengthen fighting collectives in the flights, squadrons, and regiments. The book's very title and content are directed toward developing in officer personnel devotion to the people and a high degree of readiness and willingness to defend the homeland against any and all aggression.

Naturally the fact that today's Air Force is equipped with highly-maneuverable supersonic jet aircraft and missile weapons has affected the character of air-to-air combat and has caused changes in combat modes and tactics. The new hardware, however, has not reduced but rather has increased moral and psychological stresses on the pilot. The threat of employment of nuclear weapons by the imperialist countries has sharply increased the responsibility of fighter pilots for the security of our state and has increased demands on the discipline, combat readiness, and moral-psychological staunchness of our air warriors. Precisely for this reason instructive examples from the experience of the Great Patriotic War continue to be an effective means of moral-psychological and physical conditioning of Air Force personnel and of developing readiness and willingness immediately to enter combat and thwart the adversary's aggressive schemes. In this regard as well this book by three-times Hero of the Soviet Union Mar Avn A. Pokryshkin is an important contribution toward innovative development of fighter tactics.

Another current-relevance aspect of this book lies in the fact that the author discusses the most important aspects of training fighter pilots based on the experience of the past war. The reader will read with interest the author's reflections on the organizational structure of the Air Force, on air-to-air tactics, on aircraft performance characteristics, and on the demands placed on aircraft weapons.

The author presents highly instructive descriptions of air-to-air encounters and battles as well as Soviet air operations against enemy aircraft and ground forces. He presents an interesting discussion of party-political activities and work techniques at the front.



book is written in a sincere, easy-to-understand and clear manner. In publishing this book by A. I. Pokryshkin, the USSR DOSAAF Publishing House has achieved a fine gift to Air Force veterans and to those who are today carrying on the fine traditions of the older generation and are performing the difficult job of guarding Soviet airspace. The book will also be of interest to those who dream about the vast skies and space and those who are planning to choose a career in the Air Force as a defender of the homeland. Noting the high publishing quality of this book, we should like to give a vote of thanks to editors L. V. Zhelezovskiy and Ye. Podolnyy, who skillfully coordinated and edited the contents of the 18 chapters, while preserving the author's original manner of presentation, his integrity and straightforwardness, and his deep penetration into the events of the war.

The book by Alexander Ivanovich Pokryshkin will serve as an eternal tribute to those fine warriors in arms, who made a substantial contribution to the defense of the great ideals of communism.

Moscow, "Aviatsiya i kosmonavtika", 1986.

## SINISTER ROLE OF USAF IN SEEKING WORLD DOMINATION CLAIMED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed by person 1 Jun 86) pp 30-32

[Article, published under the heading "Imperialism -- Enemy of Peoples," by Lt Col V. Goryainov: "The U.S. Air Force -- Instrument of 'Neoglobalism'"]

[Text] The peoples of the world are watching with undiminished concern the development of events in the international arena. Militant U.S. circles and U.S. NATO bloc allies, ignoring the peace-seeking aspirations of millions of people and the Soviet Union's peace initiatives, are recklessly pushing mankind into the abyss of a nuclear catastrophe. They are increasing military expenditures and developing qualitatively new strategic arms, space-based and other weapons, implementing a policy of "neoglobalism," and are committing acts of aggression against sovereign nations. "This is U.S. imperial policy in all its manifestations," noted CPSU Central Committee General Secretary Comrade M. S. Gorbachev. "In its attempt to reverse the march of history, imperialism is more and more openly coarsening its force, interference in the affairs of free peoples, and terror terrorism."

At the same time the Reagan Administration seeks to camouflage its extensive military preparations behind hypocritical "concern" with maintaining peace and the security of peoples, with broadening "democracy and human rights." They seek to justify preparations for war by the need to reestablish the allegedly lost military strategic balance. Persistent attempts are being made to present U.S. troops in the role of "guarantors and guardian of the peace" and "situation stabilizer," allegedly operating with highly humanitarian aims.

Facts and the entire history of U.S. imperialism, however, irrefutably attest to the opposite: the so-called "humanitarianism" of the U.S. military in actual fact means tragedy and inexhaustible grief for many peoples. Their present actions threaten all mankind.

The U.S. Air Force plays a leading role in carrying out the aspirations of empire and implementing the aggressive foreign policy of U.S. imperialism. It has taken direct part in almost all conflicts and local wars initiated by Washington since World War II.

Recent pirate raids flown by U.S. air forces against innocent Libyan cities are vivid confirmation of this. This, however, is only one of the links in the chain of crimes committed by U.S. military aviation. We must also mention past crimes. For example, one act which most vividly revealed the sinister role played by the U.S. Air Force was the atomic bombings of the Japanese cities of Hiroshima and Nagasaki, totally unwarranted from a military standpoint and criminal from a moral and ethical standpoint. This bloody "experiment" and the capability of aircraft to sow death and destruction thousands of kilometers from U.S. soil formed the basis of the Pentagon's strategy of employment of air forces. In aggressive U.S. expansionist plans, air power began to be viewed as the primary instrument of blackmail, pressure and threats in peacetime and the principal means of conducting combat operations in local wars and military conflicts. Operating almost always at the point of aggression, the U.S. Air Force inalterably performed the most antihumanitarian functions.

Unleashing a dirty military adventure against the Democratic People's Republic of Korea, the U.S. military virtually transformed its territory and airspace into a proving ground for testing the most barbaric weapons. During the three years of the war the air pirates destroyed approximately 9,000 factories, 28 million square meters of housing, and more than 6,000 schools and hospitals.

The world progressive press reported a great deal at the time about the barbarism and crimes committed by U.S. pilots. For example, a correspondent of the U.S. Communist newspaper DAILY WORKER, staggered by the sight of a bombed Korean city, reported: "What I saw was much worse than that which was done by the German Fascists."

The U.S. Air Force disgraced itself even more in the war against the Vietnamese people. The aggressors cynically proclaimed their goal -- to "bomb Vietnam back into the Stone Age." Pursuing this aim, U.S. fliers fully demonstrated their willingness and readiness to perform two jobs: to kill people and to destroy everything created by man. The weapons they used, such as chemical weapons, napalm, and cluster bombs, were aimed chiefly against civilians and the environment. In South Vietnam alone 44 percent of total forested area and almost as high a percentage of total agricultural land was damaged as a result of chemical herbicides.

In the fall of 1983 the world witnessed another pirate action carried out by the U.S. military against a sovereign nation -- Grenada. Washington threw against this helpless country forces from the various branches of service armed with the most modern weapons and combat equipment. The Air Force was also employed. More than 80 combat aircraft and military transports as well as dozens of helicopters delivered airborne and amphibious assault forces, conducted reconnaissance, bombed and strafed, with primarily innocent civilians as their victims.

The United States has been waging an undeclared war against Nicaragua since 1980. Armed acts of provocation have been carried out against Libya since 1981. Recently the entire world was witness to bandit raids by U.S. aircraft against Libyan cities. These raids destroyed dwellings and killed and wounded innocent civilians, including children. "This is what we are trained for," stated a U.S. Air Force pilot following these raids. Beginning in 1982, the United States carried out armed intervention in Lebanon over an extended period of time. Military aviation has taken active part in all these dirty adventures by Washington. According to an admission by Secretary of State Shultz, since the end of World War II the United States has sent troops to developing countries no fewer than 185 times to handle situations which allegedly threatened "U.S. political and economic interests."

While sending the Air Force to the most diversified "hot spots" throughout the world, the Pentagon strategists are at the same time readying it for participation in a global nuclear missile war against the USSR and the other nations of the socialist community. Delivery of a "preemptive nuclear strike" against the Soviet Union is considered to be the principal mission of the Air Force. Organizational development and growth of the Air Force, its combat and operational training are carried out precisely in conformity with these guidelines.

According to Pentagon planning, a leading role in the Air Force as the principal means of waging nuclear missile war is to be played by the Strategic Air Command (SAC), established at the beginning of the 1960's. It presently comprises 70 percent of total strategic nuclear forces, including more than 1,000 ICBM launchers and more than 500 strategic bombers. Auxiliary missions are performed by SAC tanker and strategic reconnaissance aircraft.

In order to achieve military superiority over the USSR, the United States has commenced implementing large-scale plans and programs calling for building up SAC nuclear missile strength. The main purpose of these programs and plans is to equip SAC with more highly mobile, little-vulnerable and highly-accurate systems and weapons. MX intercontinental ballistic missiles, carrying 10 super-accurate independently-targeted warheads of 600 kiloton yield each, are to be used as the newest U.S. first-strike weapon. The Pentagon plans to deploy a total of 100 of these missiles by 1990. The advocates of nuclear war, however, are not satisfied even with these weapons. After the MX program was put into operation, Washington came up with plans to develop a lighter strategic missile, the Midgetman.

Considerable importance is also attached to further development of strategic air forces. The Reagan Administration's all-encompassing program in this area calls first and foremost for the development of new strategic bombers as well as the upgrading and modernization of aircraft currently operational with SAC. For example, plans call for building and making operational with SAC 100 B-1B bombers by 1988. Each of these aircraft will be able to carry and deliver to their targets as many as 30 cruise missiles. Simultaneously under development is a totally new strategic bomber, the Stealth -- an aircraft which modern air defense assets will be unable to detect, claims the Pentagon, thanks to which it "will be successfully employed to deliver a surprise nuclear strike." A total of 150 of these bombers are to be built in the 1990's. Air Force



command authorities are also planning to continue using B-52 bombers, which since 1981 have been in the process of modification as cruise missile launch platforms.

U.S. political and military leaders also assign an important role to other components of the Air Force in implementing the strategy of "direct global confrontation with the USSR." In particular, important missions are assigned to the Military Airlift Command (MAC) as one of the principal means of strategic (intercontinental) airlifting of troops, equipment and supplies. The MAC fleet presently totals approximately 1,000 fixed-wing and rotary-wing aircraft, including more than 600 heavy-lifter and medium-lift C-5, C-141, C-130 and other transport aircraft. A large-scale effort is planned to upgrade and modernize the existing aircraft inventory, and development of new military transport aircraft is also planned. Recently the U.S. press announced development of an aircraft -- the C-17 -- with a maximum payload of more than 78 tons and a range of 4,450 km. Air Force authorities are planning to increase overall MAC capability to airlift troops, equipment and supplies by more than 40 percent by 1990.

The Air Force's Tactical Air Command is also to play an important role in achieving the global political aims of U.S. imperialism; continuous attention in organizational development of TAC is devoted to building up its strike capabilities, extending operational range, and improving command and control and target designation systems as well as aircraft armament. F-15, F-16, A-10 and other aircraft currently make up a large percentage of the Tactical Air Command's fleet, which totals more than 8,700 aircraft.

The AWACS long-range radar detection, command and control system, employing E-3A aircraft, is used to increase effectiveness of utilization of tactical air. AWACS aircraft are based and stand alert duty not only in the United States but also in Europe, in the Far East, and in other regions categorically declared by President Reagan to be a "zone of vital U.S. interests."

The endeavor to expand the significance of tactical air in war as well as to give it in peacetime the functions of instrument of pressure, blackmail, and threats is particularly graphically manifested in the concept of "forward basing" and the "airland operation" concept developed by the Pentagon in recent years. Implementing these concepts, the Pentagon has deployed more than 30 percent of total TAC assets other than on U.S. soil. The most formidable U.S. Air Force deployments have been established in Europe and in the Pacific. More than 2,000 aircraft of various types are concentrated in these regions, and the majority of these aircraft have nuclear weapon capability and, to quote Secretary of Defense Weinberger, have the capability "continuously to threaten Soviet interests as well as Soviet territory."

The Air Force is also playing a substantially increased role in connection with feverish U.S. attempts to find ways to militarize space. Pursuant to a U.S. Presidential Directive of 4 July 1982, the Air Force was duly empowered as an executive agency of the Department of Defense in the area of utilization of space for military purposes. A special Space Command was established in the U.S. Air Force in September 1982, tasked with development of plans and programs of military operations in space.

On the whole programs involving organizational development and reorganization of the U.S. Air Force, especially its strategic component, essentially signify creation of a totally new nuclear arsenal.

U.S. Air Force combat and operational training programs are focused toward achieving aggressive aims. Their main directional thrust lies not in training for missions of defending U.S. soil against an imaginary aggressor, which the Reagan Administration is trying to identify with the Soviet Union; but rather in preparing the Air Force for operations far beyond U.S. borders, primarily on "forward lines" against the USSR and the other nations of the socialist community.

Primarily serving these aims are exercises with the extensive involvement of strategic, military transport and tactical air forces as well as army aviation, exercises which the Pentagon conducts fairly regularly in various parts of the world. The nature and scope of these exercises make them increasingly more difficult to distinguish from actual operations of the Air Force and the armed forces as a whole for aggression.

Quite typical in this regard are U.S. Strategic Air Command exercises involving rehearsal of delivery of preemptive nuclear strikes against the USSR and the other Warsaw Pact countries. As a rule approximately 100-150 B-1 bomber aircraft, including up to 350 strategic bombers, take part in these exercises. The general scenario of such exercises, their steadily growing scale, and the substance of the activities they involve, as even the U.S. press admits, constitute undisguised practical U.S. preparations for waging a nuclear war.

Variations of nuclear war are not only worked out and rehearsed in exercises. Since World War II the question of employment of nuclear weapons has been worked out in a substantive manner on several occasions at the highest levels in Washington; plans of nuclear attack against the Soviet Union were discussed on four occasions. In April 1980, for example, the 101st Air Wing stationed in England, equipped with F-111 nuclear-capable fighters, were placed on a combat-ready status during execution of the operation to free the hostages in Iran. According to Pentagon plans, aircraft carrying a total of 194 nuclear bombs were on ready status to deliver a "preemptive nuclear strike" against targets within the Soviet Union if a "direct clash between the great powers" occurred in the course of the U.S. adventure in Iran.

The adventurist nature of the activities of U.S. leaders is also confirmed by the fact that, pursuant to the political leadership's plans, U.S. air power has been and continues to be extensively utilized today for the conduct of espionage and various acts of provocation against the USSR and other states with regimes which are not to Washington's liking. U.S. reconnaissance aircraft fly reconnaissance missions along the borders of many sovereign countries, frequently even engaging in deliberate incursions into sovereign airspace.

The patently aggressive nature of the role of the U.S. Air Force and its emphasis on preparing for war against the socialist countries, the Soviet

Union in particular, are also revealed by the content and many elements both of the combat training and ideological brainwashing of personnel. In the process of performing mock combat missions, during so-called commander briefing classes, and in the course of numerous briefing, propaganda, and religious activities, the notion of the inevitability of war with the Soviet Union and the other Warsaw Pact nations is methodically inculcated in U.S. Air Force personnel.

A provocational program called "Red Flag" has been developed and is extensively utilized for the purpose of developing in U.S. pilots an aggressive instinct and creating for them the opportunity in peacetime "to learn how Russian pilots think and act in air-to-air combat." Pursuant to this program, four "aggressor" squadrons are based at Nellis AFB (Nevada), Clark AB (Philippines) and RAF Alconbury (England). The aircraft in these squadrons are painted to simulate Soviet MiGs, and their pilots, wearing Soviet military uniforms, study and employ Soviet Air Force tactics. Running pilots through "aerial combat" with these squadrons, the U.S. Air Force pursues the aim of developing in this personnel not so much professional as moral-psychological preparedness for war against the USSR.

The above facts clearly indicate that it is by no means for purposes of defense that the United States is continuously improving its air forces and that U.S. actions are characterized by far from peacemaking ideals. Aggression, show of force, attainment of superiority over the USSR and the other Warsaw Pact nations and, finally, preparations for a nuclear missile world war -- the sinister role of the U.S. Air Force is manifested in full measure in all these things.

In the face of provocational and dangerous U.S. militarist preparations, the Communist Party and Soviet Government are forced to take requisite steps to strengthen the security of the USSR and our allies. These measures have been and continue to be the most effective means of holding in check the aggressive aims of imperialism, led by the United States. As was noted at the 27th CPSU Congress, an all-out increase in Armed Forces combat readiness and indoctrination of military personnel and all Soviet citizens in a spirit of strong vigilance and constant readiness to defend the great achievements of socialism constitute one of the most important tasks of the party, state, and people. Thanks to this, the defense might of the USSR is maintained at a level enabling us to offer resolute countermeasures to any aggressor.

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CSO: 9144/382

## SENIOR FLIGHT OPERATIONS ENGINEER DUTIES DESCRIBED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 32-33

[Article, published under the heading "Advanced Know-How Put Into Practice by Aviation Engineer Service," by Maj G. Paradnik: "The Engineer in Flight Operations"]

[Text] The fighter, just as aircraft of other types, is a crew-served weapon. Dozens of specialist personnel prepare it for flight operations. And it is quite natural that the quality of aircraft servicing and consequently the end result as well -- aircrew performance of combat training missions -- depend on conscientious performance of job duties by all ground personnel.

An important role in organizing this crucial process is played by the senior flight operations engineer, who is one of the specialization-area regimental engineers and is appointed for each flight operations shift.

I can state on the basis of our unit's experience that during flight operations this person in authority is perhaps no less important than the flight operations officer. The flight operations shift senior engineer sets the tone in the performance of ground maintenance personnel. The degree of precision and organization of the work performed by ground maintenance personnel will depend in large measure on how, after taking the roll of aviation engineer service personnel and inspecting their appearance and gear at formation, he specifies the required number of specialization-area technicians and mechanics, briefs them on the flight operations schedule, the specific features of aircraft servicing and maintenance on the eve of and during flight operations, and gives instructions to the flight-line detail. During flight operations he details the positioning of aircraft on the ready ramp, reminds the men of the need to observe safety procedures, and organizes efficient servicing of the combat aircraft. Success is determined in large measure by his ability to direct his men with precision and efficiency.

Maj B. Bobrov, who had proven himself as an experienced specialist and organizer of aircraft servicing and maintenance, was named senior flight operations engineer for a certain flight operations shift. As prescribed by regulations, in the process of preflight preparation that day, this officer checked off his equipment against the list, had his men check the equipment to



make sure it was in operating condition, as well as quality and condition of fuel, lubricating oil, servicing fluids and gases, briefed the technical inspection posts and technical assistance teams, and then personally walk-around preflight-inspected the weather reconnaissance aircraft.

In the meantime maintenance personnel were readying fighters for the first departures. When the weather reconnaissance aircraft returned to the field, the squadron deputy commanders for aviation engineer service had already reported their aircraft ready to the senior flight operations engineer.

Major Bobrov certainly deserved part of the credit for the fact that flight operations commenced in a smooth and organized fashion and that there was not a single failure to adhere to the flight operations schedule. His experience is instructive.

Each flight operations shift has its own features and its own flavor. The work load on aviation engineer service personnel, for example, is determined on the basis of the content of training activities scheduled for the aircrews and their complexity. Party member Bobrov takes all these factors into consideration. He ignores nothing and, most important, he approaches flight operations support innovatively and in a good-management manner. As we know, an empty tank by a heavy tow vehicle or fuel tanker as well as overconsumption of fuel and lubricants, and unnecessary vehicle engine operating time are quite costly. Major Bobrov is well aware that thrift and economy begin with small things. Prior to leaving for the airfield, he always studies the flight operations schedule and the specific features of the work to be performed during the flight operations shift by aviation engineer service personnel. He then checks the condition of support facilities and equipment. In short, he does everything to make his contribution to precision conduct of flight operations and to avoid the slightest interruption in operations flow, which can result in overexpenditure of resources.

Major Bobrov also has a very serious attitude toward ensuring precision and organization during flight operations. He always distributes his ground servicing manpower and resources among zones, in a thoughtful manner. This engineer seeks to ensure that each zone contains everything necessary for turning aircraft around to go out again, for even the slightest delay in the arrival of a fuel tanker or jet-engine starter vehicle to an aircraft disrupts the operating rhythm of aviation engineer service personnel and makes aircrews anxious and nervous. Naturally aviation engineer service personnel begin working in haste in order to make up for lost time. This results in mistakes, which affect the quality of aircraft servicing.

Maintaining constant communications with the squadron deputy commanders for aviation engineer service, Major Bobrov always analyzes the airfield performance of aviation engineer service personnel in a thoughtful and objective manner. When he is involved in flight operations, he takes notes in his notebook, always notes down errors and deficiencies in equipment servicing, and evaluates in an exacting manner mistakes made by Air Force personnel during this period. His comments at flight operations critique and analysis sessions are distinguished by specificity and a businesslike character and serve as a good school of indoctrination of technical

knowledgeability and follow-through, and help develop initiative and innovativeness in aviation engineer service personnel.

We have learned through personal experience that accomplishment of the flight operations schedule and observance of prescribed regulations and procedures at the airfield by personnel depend in large measure on the senior flight operations engineer, his efficiency, skill, and ability correctly to organize the labor of a large number of persons and to coordinate their activities in a precise manner.

During engine startup on one of the aircraft, for example, technical inspection post OIC Sr Lt O. Volodin spotted a barely noticeable leakage of gas from the main pressurization system. Under certain conditions this could lead to undesirable consequences, especially during landing. It was only thanks to prompt, precise actions by aviation engineer service personnel that the problem was corrected and the combat aircraft was able to go back up after a short time. Essentially a mishap-threatening situation had been prevented. Considerable credit for this must also go to the senior flight operations engineer. Sr Lt S. Bardychevskiy, one of the unit's activist efficiency innovators, a knowledgeable, conscientious specialist, an experienced methods expert and indoctrinator, also gave a great deal of assistance to the ground maintenance personnel. His practical advice and keen professional perception greatly helped in successfully getting the fighter back in action.

Other officer-technicians also not only carefully inspected aircraft at the technical inspection post but also helped preflight them in a quality manner.

Experience indicates that thorough preflight inspection of aircraft is a guarantee of successful mission accomplishment. During this phase our unit's aircraft technicians, thanks to rigorous inspection of the combat aircraft, promptly detected problems in certain systems. Lt K. Yurkevich, for example, as he was readying an aircraft for its next sortie, discovered damage to the housing of the boundary layer control mechanism. A subsequent closer examination revealed that this had been caused by hot gases escaping through a crack in the burner can of one of the engines. Aircraft technician Lt Yu. Utkin discovered on the basis of indirect symptoms a small crack in an engine oil tank fitting. Further widening of the crack would have resulted in oil leakage and, as a consequence, to an inflight emergency situation.

There should not be excessive attention to form with consequent detriment to content, and there should be no unnecessary situation simplification in readying aircraft for flight operations. Our aviation engineer service supervisory personnel proceed precisely from this position when organizing work on the aircraft by maintenance personnel both on days of preliminary preparation and during flight operations shifts. On flight operations days, by their energy, words and deeds they inspire the men to ready the aircraft in a high-quality manner and organize their labor as required by aviation engineer service prescribed procedures and regulations.

...The flight operations shift had come to end, but the senior flight operations engineer's workday was not yet over. Major Bobrov got comments from the flight operations officer on aircraft performance, prepared a

performance summary of the flight operations shift, organized post-mission servicing, and reported the results of the flight operations shift to the unit deputy commander for aviation engineer service.

Thus our airmen are increasing the unit's combat readiness day by day with their military labor, making a worthy contribution to the common cause of strengthening the combat might of the Air Force.

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## HELICOPTER NEAR-MISHAP FROM CARELESS PREFLIGHT INSPECTION

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jul 86) p 35

[Article, published under the heading "This Could Have Avoided," by Senior Flight Technician-Instructor Capt Ye. Bozhko: "Haste Makes Waste"]

[Text] Immediately after takeoff, during climbout, the aircrew heard a loud knocking sound and felt a strong vibration: the starboard engine cowlings had suddenly popped open. A few minutes later, following the instructions of the assistant flight operations officer, the helicopter made a forced landing.

They had experienced a serious mishap-threatening situation, which only by sheer luck had not ended in tragedy. With the cowlings carelessly latched, the cowlings securing fittings might have been unable to withstand the powerful airstream, and parts torn free would then have entered the main rotor and damaged the blades. Fortunately the incident had ended safely. It was also fortunate that they were close to the ground at the time.

The reasons for the mistake were a lack of discipline by the aircraft commander and crew members, as well as an excessively perfunctory job of preflighting the helicopter. In performing their duties, the aircraft commander and his men committed several violations of procedures. Flight technician Sr Lt V. Kovalchuk, for example, instead of carefully inspecting the engine compartments and thoroughly checking the cowlings latches, made a cursory, superficial inspection due to the press of time. Proceeding in haste, he merely slapped the latches and quickly climbed on board. Aircraft commander Capt A. Smirnov, without waiting for his flight technician's report, ordered the engines fired up. Nor had the copilot, Capt A. Kalinin, observed all the required procedures of preflight inspection. And yet all their procedures are spelled out by the documents which govern flight operations and aircraft maintenance and operation on the ground and in the air. All that was necessary was faithfully to carry out these procedures. What actually happened was quite different.

This annoying incident indicates that one still sometimes encounters cases of negligence and irresponsibility during premission preparations. Some aircrews excessively simplify the preparatory procedures, which are prescribed as absolutely mandatory in the appropriate aviation engineer service documents.



Main and secondary tasks arise artificially in this manner. Flight and engineer-technician personnel focus their attention more on handling the principal items, with a tendency to ignore certain so-to-speak less important items, although we should emphasize that in our work there are not and should not be items which are more significant and less significant. Everything is important in aviation. Nevertheless some specialist personnel do make such a division by importance. And, what is particularly vexing, subunit aviation engineer service supervisor personnel sometimes fail to respond properly to such actions. This apparantly indicates poor oversight by persons in authority, particularly flight technical maintenance unit chiefs.

Nevertheless one could sense some hidden irritation in the conduct of the members of A. Smirnov's crew, who did not immediately acknowledge their guilt: in their view a lot of fuss was being made over a trivial error. This attitude did not go unnoticed by our party organization. A party meeting was held, at which party members pointed out the intolerability of a careless, negligent attitude toward performance of job duties.

In light of the decisions of the 27th CPSU Congress, a nationwide campaign to improve product quality is presently underway. The party's policy aimed at speeding up the reorientation of people's thinking and at accomplishing a sharp improvement in technology also requires that we Air Force specialist personnel radically reexamine our attitude toward performance of job duties. Such an approach to the assigned task will help us put a definite end to excessive attention to form with consequent detriment to content as well as to carelessness and negligence in operation and maintenance of complex aircraft, and will help us more rigorously observe the requirements of documents aiming to achieve mishap-free flight operations and to avoid mishap-threatening situations. This will without doubt substantially increase the efficiency and combat-readiness of aircrews and strengthen organization, discipline, and follow-through.

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CSO: 9144/382

#### BOOK ON PEACEFUL USES, MILITARIZATION OF SPACE REVIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) p 39

[Article, published under the heading "New Books": "Space and Peace"]

[Text] Professor and Doctor of Juridical Sciences G. P. Zhukov, a specialist in the field of international space law, has written a book devoted to this extraordinarily crucial problem ("Kosmos i mir" [Space and Peace], Moscow, Nauka, 1985, 88 pages, 45 kopecks). The very chapter titles -- "Space for the Benefit of Mankind," "Preventing Militarization of Space," and "International Cooperation in Space" -- suggest the range of issues addressed in this book.

The author examines space as a new domain of human activity. The area of utilization of the achievements of the space program for the benefit of man is quite extensive: areas include weather forecasting, study of Earth resources, communications, TV broadcasting, the COSPAS-SARSAT satellite system, and industrialization of space.

One chapter is devoted to exposing U.S. plans to turn space into a theater of military operations and a springboard for aggression against other countries. In conditions of detente, thanks to initiative on the part of the USSR, international agreements have been concluded which block some channels to militarization of space. The signature of U.S. representatives is also to be found on these documents. U.S. military experts, however, are presently attempting to find ways to bolster the argument that their aggressive plans are compatible with the obligations specified in these treaties.

Bilateral cooperation is a widespread form of uniting the efforts of nations in the peaceful exploitation of space. The author cites joint efforts between the Soviet Union, India, and France as an illustration. The joint Interkosmos program is being successfully carried out within the framework of cooperation between the USSR and the socialist countries. This is discussed in the book's third chapter.

At Soviet initiative, the issues of peaceful exploration and utilization of space are a constant topic of discussion at UN General Assembly sessions. As the author correctly notes, however, as international relations become aggravated as a result of the general militaristic policy being followed by

the present U.S. Administration and its efforts to extend the unchecked arms race into space, the activities of nations connected with utilizing space for peaceful purposes and cooperation in this area are being endangered. A change for the better is needed in the international arena. The peoples of the entire world are waiting for and demand such a change.

This book will be of assistance in the work of Air Force unit and subunit agitators and propagandists.

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CSO: 3114/382

## NIKOLAYEV DISCUSSES COSMONAUT TRAINING

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 40-41

[Article, published under the heading "Cosmonaut Training," by twice hero of the Soviet Union Pilot-Cosmonaut USSR Maj Gen Avn A. Nikolayev, first deputy commanding officer, Cosmonaut Training Center imeni Yu. A. Gagarin: "New Profession of the 20th Century"; first part of a two-part article]

[Text] The profession of cosmonaut has existed in this country for a quarter of a century now, a profession requiring boldness, fortitude, calculated risk, and the ability to withstand high G forces. A number of specific features of fundamental importance distinguish it from many other professions.

This was vividly demonstrated by the 237-day mission flown by Soviet cosmonauts L. Kizim, V. Solovyev, and O. Atkov, who on this longest mission in the history of space exploration displayed profound professional knowledge, tenacity and endurance, maintained a high degree of working efficiency throughout the entire mission and, most important, added greatly to the aggregate experience of utilizing space for nonmilitary purposes.

Cosmonauts V. Dzhanibekov and V. Savinykh undertook a bold, risky leap into the unknown. They docked a transport spacecraft with the Salyut 7 station, which was out of control, and restored it to operation, a first in the history of Soviet space exploration.

A system of training cosmonauts has been developed in our country and has been tested and proven over many years of practical experience. The principles on which it is based have been scientifically substantiated. The content, phases, and types of training have been defined. This is the subject of the following article.

The manned spaced program has accomplished a glorious journey. The cosmonauts of space are undaunted by the various problems and difficulties encountered on this journey. Experience has shown that work in space requires considerable knowledge, composure and stamina, and precise reactions, while manned orbital missions lasting many months require of the crews solicitous attention toward one another, sensitivity, patience, and a sense of responsibility to the team.



orbiting the Earth in orbit.

Yuri Gagarin was the first man to view our planet from space. Twenty-five years have passed since that day. Space hardware and technology have much evolved and improved during this time, and the capabilities of space technology have increased immeasurably. Star City has also changed significantly. Scores of one-man, two-man and three-man primary and backup crews have been trained at the Cosmonaut Training Center imeni Yu. A. Gagarin. A total of 60 crews have flown manned missions: 60 Soviet cosmonauts and 9 cosmonauts from brother socialist countries, as well as representatives of France and India. Tireless work by the cosmonauts themselves as well as the specialized personnel who trained them for their missions, work filled with extraordinary diversity and complexity, lie behind these impersonal numbers.

The unique nature of man's professional activity in space is connected first and foremost with weightlessness. How is it manifested? On the one hand one feels released from terrestrial gravity and has freedom of motion, while on the other hand one feels an inflow of blood to the head, various symptoms of "space sickness." One cannot work in gravityless space without hand- and footholds, and the experiences discomfort from the lack of notions of "up" and "down" which are natural to man. German Titov found himself face to face with weightlessness lasting 24 hours. Today, in part due to his mission, we know that the most critical period of adaptation takes place precisely during this time.

The process of adaptation to working in such conditions is a complex one. Not only is it necessary to maintain or adjust skills learned on Earth. It is necessary to acquire new skills essential for working in conditions of weightlessness, and especially for EVA activities. It is known the first doctor-cosmonaut (this took place more than 20 years ago) was observed during a 24-hour mission on board the Voskhod spacecraft how G forces affect the organism and the initial period of adaptation to weightlessness occurs. In those years extended missions were the reality of the future.

I shall never forget my sensations following an 18-day mission on board the Soyuz 1 spacecraft. Vitaliy Sevastyanov and I endured the mission well and, frankly speaking, we were not expecting to experience after our return any difficulties of adaptation -- reverse-accustoming oneself to terrestrial conditions. Shortly had the craft touched down when we felt the pull of terrestrial gravity. We had difficulty getting out of our seats and standing on our legs refused to obey -- they had become both cottony-weak and at the same time leaden-heavy. We experienced a rush of weakness and accelerated palpitation. I felt blood draining from my head toward my legs. In short, at first the cardiovascular system was unable to adapt to conditions of terrestrial gravity. I sat back down, and began to feel better. The people on the ground helped us out of the craft and onto the ground.

I felt just a few symptoms during the mission. The doctors also noted a slight unsteadiness -- unsteadiness when standing, uncertainty and unsteadiness during walking. It took several days to become

disaccustomed to weightlessness. All objects seemed heavy and even cumbersome.

Weightlessness in orbit and terrestrial gravity are mutually-excluding factors which act upon a cosmonaut. This must be borne in mind when considering future extended missions.

Scientists and specialist personnel directed their principal efforts toward developing measures and means of combating impairment of functioning of the cardiovascular and musculoskeletal systems, as well as electrolyte metabolism. A complex of preventive measures was developed, which helps preserve health and maintain a high level of aircrew fitness. For example, during a mission cosmonauts perform physical exercises employing spring-resistance tension muscle developers, a bicycle ergometer, and a treadmill with tension-pulling chest straps. Penguin stress-loading suits, which during motion generate a constant axial load on the cosmonaut's musculoskeletal system, are being used with good effect. On the final days of their 237-day mission, Leonid Kizim, Vladimir Solovyev, and Oleg Atkov, preparing for their return to Earth, held regular workouts in the Chibis vacuum suit, in which the effect of terrestrial gravity is simulated by barometric pressure differential. Various pharmacological preparations also play a certain role in preventing adverse effects of weightlessness.

It is appropriate to state that manned space flight is impossible without excellent physical fitness. The experience of the Cosmonaut Training Center confirms that physical training develops strength, agility, resourcefulness, boldness, endurance, and enables one to develop good coordination of movements. All these qualities are essential to the cosmonaut during a flight, where he encounters high G loads, an extended period of weightlessness, as well as other unaccustomed factors. The physical training program prescribes mandatory morning calisthenics plus 2 hours of physical training and sports. Activities include gymnastics, dumbbells, barbells, trampoline, swimming, including underwater, bicycling, skiing, ice skating, tennis, soccer, basketball, volleyball, speedball, ice hockey, and field hockey.

A cosmonaut must possess various job-related skills. For example, he functions as an equipment operator when managing the spacecraft's systems, and as a scientific worker he performs experiments in various areas of science and technology. He also installs and repairs equipment, and he performs the duties of radio operator, movie and still photographer, as well as TV commentator.

Sometimes one must learn new jobs. Scientists of the most diversified specialization areas have the crew perform various tests and experiments. Let us say that the decision has been made to test the possibilities of electric welding in a vacuum. This is very important for performing construction activities in space. This means that the cosmonaut must learn to be an arc welder.

All these factors determine the combined, comprehensive nature of crew training and cooperative endeavors by the organizations involved in cosmonaut

training.

Stringent demands are also placed on the cosmonaut's mental and emotional state. He must be emotionally stable, capable of independent decision making and execution, and he must innovatively approach performance of assigned tasks. Of course self-sufficiency and independence of action on the part of crew members are combined with a complex functional interlinkage of their activities with Mission Control. Cosmonauts are responsible for completeness of gathering of information and its prompt transmission to Earth. This is particularly important if deviations from normal flight parameters occur.

This is why experimental psychological studies connected with increasing the efficiency of crew activities take on considerable significance. On the basis of such studies, specialists draw up recommendations on optimal physical and mental work regimens, as well as for cosmonaut rest and sleep schedules. A complex of psychological symptoms, usually expressed by the terms anxiety and suggestibility, is considered in the process of selecting cosmonaut candidates. For example, the cosmonaut psychological training system includes measures aimed at overcoming or diminishing nervous anticipation, uncertainty, and worry about a safe outcome.

Considerable attention is devoted to modeling a cosmonaut's mental and emotional state when procedures in flight emergency conditions are practiced. Success is determined by the strictness of demands on the individual's mental and emotional state during practice sessions. It is also necessary to diversify the means and methods of emotional stimulus. One can scarcely overstate the importance of flight and parachute jump training. This training helps develop the required personality, volitional and professional qualities and helps acquire habits of working under conditions of stress. An airplane can be viewed as a cosmonaut simulator for controlling a moving object during the combined action of physical and emotional stresses. By flying an aircraft, a cosmonaut acquires habits and skills of independent decision making in a complex situation.

Parachute jump training is an important stage in forming requisite cosmonaut psychological and emotional qualities. In conditions of free-fall this is fostered by a combination of self-sufficiency, independence, and risk. This results in strengthening such volitional character traits as purposefulness, determination, persistence, self-control, independence, and such traits as boldness, courage, bravery, fortitude, and discipline are developed.

A cosmonaut is first and foremost a tester of new equipment. This is an important feature of his profession, one might say the content of his entire activity. Achievements of dozens of fields of science and technology are concentrated in a spacecraft and orbital station. Therefore continuous accumulation of experience and improvement of essential qualities is an indicator of a tester's proficiency. His performance capabilities are particularly rigorously tested during decision-making in difficult situations. We could cite a great many examples where cosmonauts have performed skillfully in such situations. Suffice it to recall the docking of the Soyuz T-13 spacecraft with the Salyut 7 station. Vladimir Dzhanibekov and Viktor Savinykh confirmed the feasibility of approaching errant orbital vehicles for

the purpose of performing repairs and preventive maintenance. This operation assumes particular significance in the rescue of the crew of a spacecraft unable to return to Earth due to malfunctioning of onboard systems.

Thorough preparation helped Dzhanibekov and Savinykh achieve success. Instructors at the Cosmonaut Training Center devised new methods, refined piloting technique, and sought to achieve greater accuracy and reliability in performance of operations. One set of conditions would be replaced with another, and one docking would be followed by another. The instructors were constantly introducing new difficulties and devising "failures" of various instruments. This is where the cosmonauts' qualities as testers were tested! I do not deny that mistakes were made at first. They became less frequent as time passed. Dzhanibekov and Savinykh learned to fly with new instruments, using new methods, and under new conditions.

Space flight is a test not only of equipment but also of man, and this always involves hazard. The main thing is the degree to which a person is psychologically prepared to meet and overcome difficulties. There are many such instances in the cosmonaut profession. Of course just prior to launch a spacecraft crew is thinking not only about the danger and how to surmount it. Sergey Pavlovich Korolev stated that if a cosmonaut perceives a forthcoming mission as an exploit and act of self-sacrifice, this means that he is not sufficiently ready. Crew members should treat a mission as a difficult and important task which requires maximum mobilization of all energy and resources, professional skill, and utilization of intellect and intuition in accomplishing the assigned task. (To be concluded)

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## U.S. SPACE LAUNCH FACILITIES REVIEWED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 42-43

[Article, published under the heading "Responding to Readers' Questions," by Lt Gen V. Ivanov: "U.S. Space Launch Facilities, Rockets, Satellite Systems"; based on materials published in the foreign press]

[Text] A suggestion was articulated at reader conferences at the Kubinka and other Air Force garrisons that this journal discuss presently-existing and in-development foreign military space programs. A. Askarov and V. Khetagurov asked in their letters to the editor what booster rockets the United States employs, how many satellites have been launched with these rockets, and they ask about the specifications and performance of space hardware.

The following article contains replies to these questions.

Continuing to implement an aggressive policy, for quite some time U.S. imperialist circles have been devoting heightened attention to utilization of near-Earth space to gain a dominant position in the world. Development of military space-based systems permanently operating in Earth orbit has become a material embodiment of U.S. government policy in space.

Viewing space not only as a domain of scientific, technical and economic rivalry with the Soviet Union but also as a future theater of military operations, U.S. military and political circles have adopted a policy aimed at developing and deploying in space fundamentally new space-based combat systems. In the opinion of U.S. leaders, this would ensure for the United States in the future a dominant position in the world arena, while at the present time the United States is allegedly concerned with ensuring the security of its people and securing peace as a whole.

U.S. space launch centers are one link in an integral chain in implementing these plans. They were first established in this country in the latter half of the 1950's and were connected with commencement of systematic exploration and exploitation of space for various purposes, primarily military. The United States presently contains four launch centers, two of which are run by

the Department of Defense, while two belong to the National Aeronautics and Space Administration (NASA). All space launch complexes are at coastal locations: one on the Pacific and three on the Atlantic Coast. There is reason for these locations. They provide an optimal selection of ocean impact areas for separated booster components, which makes it possible maximally to utilize their energy in the launching of space vehicles into orbit.

The U.S. Department of Defense's launch facilities are called the Western and Eastern Space and Missile Test Centers. The Western, located on the Pacific Coast, is the principal facility involved in carrying out the country's military space program. The facility covers an area of approximately 400 square kilometers and contains a vast complex of specialized structures and extensive capabilities for launching space vehicles. Direct launching of satellites into orbits with inclinations from 58 to 112 degrees, without additional maneuvers in space, is accomplished from this facility.

This facility contains 7 launch complexes with 10 launch positions. In the opinion of foreign experts, this facility is capable of launching 70 boosters a year. Launches of the reusable Space Shuttle exclusively for Pentagon purposes are scheduled to begin in 1987, under conditions of the strictest secrecy. Special technical and organizational measures have been carried out toward this end.

Other launch complexes at this facility are for launching several versions of the Thor-Delta, Scout, Atlas, and Titan boosters. These boosters are used to launch into orbit such U.S. reconnaissance satellites as Samos, LAGEOS, KH-11, Ferret, as well as Cod 711 and 749 satellites. Landsat Earth resources satellites as well as various navigation, communications, weather and experimental satellites are also launched from this facility. The Western Space and Missile Test Center will continue in the future handling the lion's share of launchings of Pentagon payloads.

The Thor-Delta is a light-payload booster, designed to launch geodetic, weather, communications, and research satellites. The first satellite launched by this rocket was boosted into orbit at the beginning of 1974. The Thor-Delta was upgraded on several occasions after becoming operational in order to perform new missions. Modified versions of this three-stage booster can launch payloads weighing up to approximately 2 tons into various Earth orbits. In all instances the cost of a launch exceeds 20 million dollars.

The Scout booster is in the same class and is used to launch navigation and geodetic satellites as well as scientific payloads. This rocket entered service in 1960. To date it has boosted more than 100 payloads into orbit. The weight of a payload launched into Earth orbit by the Scout booster does not exceed 180 kg. The cost per launch is about 5 million dollars.

The Atlas booster is also in the light-payload class and is used to launch navigation, communications, research and experimental satellites. This booster has been operational since April 1968. It has launched a total of about 20 satellites of various types, weighing not more than somewhat in excess of 5 tons. The cost per launch ranges from 18 to 40 million dollars, depending on the version of the booster used.

Recently-used versions of the Titan booster are classified as medium-payload launch vehicles and can boost communications, navigation, reconnaissance, and experimental satellites into various orbits. This rocket was used to launch the Viking interplanetary probes, the Mariner, Pioneer, and other vehicles. The Titan booster per-launch cost ranges from 40 to 85 million dollars, depending on the version used.

The reusable Space Shuttles are at the present time the sole U.S. heavy-payload launch vehicles. They are capable of delivering into orbit payloads weighing up to 29.5 tons. The Space Shuttle is continuously being improved, with the aim of increasing the weight of payloads it can put into orbit. This costly means of transportation was developed within the framework of a special national program and is still being ballyhooed as a triumph of U.S. technology. The recent "Challenger" disaster, however, widely reported by the world media, has eroded faith in this system.

According to available information, an important contributing factor to this tragic event was the rushed nature of all activities connected with development and operation of the Space Shuttle, as well as a disinclination on the part of certain NASA and U.S. Government officials to acknowledge the need seriously to address the problems of astronaut safety. It was noted in the course of analysis of the causes of the disaster that shuttle craft are too complicated and unreliable, and this results in numerous failures of various onboard systems during preparation for launch and during orbital flight. The system of diagnosing a shuttle craft's technical state and condition also proved to be inadequate, which led to a chain of events which took the mission control team completely by surprise.

The U.S. Department of Defense conducts photoreconnaissance of the territories of foreign countries with the aid of Samos and IASP satellites. The Samos became operational in 1963. It was upgraded in 1966 and given the designation Samos M. This vehicle is launched as a rule once a year and remains in orbit for a period of three to three and a half months. It is expected that in coming years Samos M will be retired from service as obsolete.

The IASP is a more sophisticated reconnaissance satellite than the Samos. Launches began in 1971 and have continued periodically up to the present time. Possessing more extensive intelligence-gathering capabilities, IASP enables U.S. intelligence agencies to gather a large volume of information for the benefit of U.S. military and political leaders. It can remain in orbit more than 6 months and is capable of periodically adjusting its orbit with an onboard propulsion system. A special radio channel as well as canisters containing exposed film, ejected from the platform as needed, are used to obtain more prompt delivery of intelligence information. The canisters are snared in midair by U.S. Air Force aircraft and are delivered to special intelligence processing centers.

The KH-11, which became operational in 1976, is an even more sophisticated reconnaissance satellite. Employed as a rule in pairs, these vehicles ensure the promptest acquisition of intelligence, which is transmitted by radio

channel to ground stations, from which it is passed on to a special center where it is processed for submission to intelligence authorities.

Cloud cover data obtained from weather satellites is used to improve the operational effectiveness of Samos, IASP, and KH-11 satellites. INTELSAT communications satellites are utilized in the intelligence-gathering system.

Ferret satellites, as well as the more sophisticated Code-711 and Code-749 satellites, were developed by the United States for the conduct of signals intelligence. Ferret satellites are launched as a rule together with photoreconnaissance satellites, from which they separate once they are in orbit. They then transfer to higher orbits, where they operate for a period of several years. They periodically transmit information on operating modes of electronic emissions via radio channel to ground receiving stations. Code-749 satellites were developed and are used for the U.S. Navy and provide capability to monitor the location of ships in the waters of World Ocean from their electronic emissions.

The facility operates nine fixed-site telemetry stations for obtaining trajectory measurements and telemetry monitoring during satellite launch and subsequent orbital flight; these sites are scattered across a vast territory extending from the Continental United States to the Hawaiian Islands. Mobile shipboard and airborne telemetry stations can also be called upon when necessary.

The Pentagon's Eastern Space and Missile Center is located on the coast of Florida and occupies a site totaling 68 square kilometers. It contains four launch complexes with four launch positions for several versions of the Titan booster. Satellites launched from the Eastern Space and Missile Center range from 28.5 to 57 degrees inclination. It is most advantageous to launch military geostationary satellites from this facility. INTELSAT satellites, designed to detect ballistic missile launchings, as well as DSCS and LES communications satellites are launched from here.

INTELSAT satellites are placed at positions from where they have a clear view of those regions of the Earth from which non-U.S. ballistic missiles might be launched. Information from these satellites is transmitted to two ground stations sited in the United States and Australia. U.S. military and political leaders attach particular importance to the reliable functioning of these satellites.

DSCS and LES satellites are launched for the U.S. Department of Defense, to maintain continuous two-way communications within the government and military command and control system, as well as for the conduct of experiments for the purpose of improving satellite military communications. These satellites provide the U.S. armed forces with communications virtually everywhere in the world except in the polar regions.

The fixed-site telemetry stations of the Eastern Space and Missile Center are located along satellite launch paths, up to a distance of 7,000 kilometers from the Florida Peninsula. There are eight of these stations. In addition, shipboard and airborne telemetry stations are also employed.



NASA's Kennedy Space Center directly adjoins the ESMC, occupying a site totaling 355 square kilometers and with payload orbital inclination figures similar to the ESMC. Sometimes it is used not only to launch civilian payloads but military payloads as well, such as Fleetsatcom, NATO, and Skynet communications satellites. NASA launch facilities are also used to launch payloads for other countries.

Fleetsatcom satellites are used in the U.S. Navy command and control system, and in addition carry strategic offensive forces command and control relay transmitters.

Other launchings include NATO forces command and control satellites bearing the designation NATO, as well as Skynet satellites for British military forces command and control. They all play an important role in ensuring stable communications for top-level military and political authorities of the aggressive NATO bloc.

The space center contains 5 launch complexes with 8 launch positions for boosting vehicles into orbit, which provides a capability of up to 45 launches per year. The first launching of the Space Shuttle, which is extensively utilized by the Pentagon, took place here.

Future plans call for continuing intensive utilization of space launch facilities at Cape Canaveral for civilian agencies of the United States and other Western nations. The center operates a number of telemetry stations, located both in the vicinity of the Florida Peninsula as well as in Botswana, Senegal, and elsewhere.

NASA maintains a second launch facility on Wallops Islands, Virginia, located on the U.S. East Coast at approximately 37 degrees north latitude. The facility occupies a 10 square kilometer site and contains 2 launch complexes with 2 launch positions. Vehicles launched from this facility have orbital inclinations of 37-34 degrees. This facility, extensively utilized by NASA in the past and capable of handling up to 40 launches per year, was placed under the Goddard Space Flight Center and is not being used at the present time, since primarily the Space Shuttle, launched from Cape Canaveral, is being used to place payloads in orbit. This facility's future will apparently depend on NASA requirements for launching payloads with nonreusable boosters.

On the whole, in view of the fact that steadily increasing attention in the United States is being devoted to the space program, we can expect that space launch centers, as a major, integral element of this program, will experience further development and will be extensively utilized toward the end of achieving superiority in space.

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#### SOVIET-FRENCH COOPERATIVE VENTURES IN SPACE RESEARCH PRAISED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 7, Jul 86 (signed to press 3 Jun 86) pp 44-45

[Article, published under the heading "Peaceful Orbits of Cooperation," by V. Sirotin: "At Crossroads in Space"]

[Text] France was the first capitalist country with which the Soviet Union signed an intergovernmental agreement on cooperation in the investigation and exploitation of space. This cooperation has been proceeding very well and is making a substantial contribution both to the development of world space science and toward strengthening friendly relations between our two countries. The visit by CPSU Central Committee General Secretary Comrade M. S. Gorbachev to France in October of last year was a most important external-relations event for that country. Matters pertaining to the peaceful exploitation of space occupied a special place in these Soviet-French summit talks.

Pursuant to a formal agreement at the highest level, on 7 March of this year a protocol between Soviet and French delegations was signed at the Presidium of the USSR Academy of Sciences, dealing with preparations for and conduct of a joint manned mission. A second Soviet-French mission is to take place in 1988, on a Soviet spacecraft and orbital station.

The following article discusses organization of Soviet-French cooperation in space and describes the most important scientific experiments and means utilized to conduct them.

30 June marked the 20th anniversary of the signing in Moscow of an intergovernmental agreement between the USSR and France on cooperation in the investigation and exploitation of space for peaceful purposes. Both parties affirmed that this agreement was in conformity with the traditional spirit of friendship between the Soviet and French peoples and would constitute an important step toward European scientific and technical cooperation.

It is interesting to note that just a few days before the signing of this agreement, the then French President General deGaulle visited the Baykonur space launch facility, where he learned of Soviet achievements in the area of development of space hardware. Our country already had a great deal of which to be proud at that time, while France was taking its first steps in the area of space exploration. The first French satellite, the A-1, was lifted into orbit on 26 November 1965 atop a Diamant booster.

Cooperation was specified in such areas as space physics, meteorology, and satellite communications. Space biology and medicine were later added to this plan. The Inter-Science Council under the USSR Academy of Sciences and France's National Center for Space Exploration (CNES) were tasked with organizing practical implementation of this agreement.

Joint studies by scientists of the two countries commenced in October 1967 with investigation of the polar ionosphere at a Soviet polar sounding rocket launch (on the island). Scientists utilized to measure air temperature the phenomenon of resonance glow of an artificial sodium cloud at an altitude of 120-130 km under the effect of solar radiation. Soviet MR-12 meteorological rockets were used to produce the artificial clouds. A comparison of the results of autumn and spring observations indicated that the temperature of the atmosphere (at an altitude of 165 km) drops approximately 227 [sic] degrees during the polar night and, consequently, a seasonal temperature variation exists. Thus a linkage was established between thermal conditions of the upper atmosphere and the 11-year cycle of solar activity.

Since 1968 Soviet M-100 meteorological rockets have been launched on a regular basis from the French island of Kerguelen, for the purpose of taking atmospheric and ionospheric measurements. Soviet-French satellite communications experiments began later [sic], in 1968-1969. At that time simultaneous observations were made of the Earth's cloud cover in the visible and infrared regions of the spectrum with instruments carried by a Soviet Meteor-3M satellite and instruments deployed by French Colomb captive balloons.

Joint research in the field of space physics began on 28 May 1971 with the launching of the Soviet Mars 3 unmanned interplanetary probe from the Baykonur space launch facility; this probe carried French instrumentation to study the characteristics of the Sun's radio emissions. The same events were recorded at a radio-telemetry facility in France (the town of Nans) and by the Mars 3 probe itself. It was possible to obtain a spatial diagram of the emission of several tens of thousands of bursts of solar radio emissions. These investigations were continued by the Mars 6 and Mars 7 interplanetary probes. These studies resulted in plotting a new model of the Sun's inner corona. The first joint experiment to study solar gamma and X radiation was conducted in 1971 using a large instrument (a neutron and photon energy spectrometer) carried by the Soviet Prognoz 2 satellite. This experiment coincided with a period of solar storms and made it possible to detect gamma emissions with energies up to several Mev, as well as to determine the chemical composition and density of the solar atmosphere in the region of a solar flare. New data on emission of gamma and X radiation were obtained with the aid of the French Spect 3 satellite, launched by a Soviet booster on 17 June 1977 from the Baikonur launch facility.

Emissions of the interplanetary medium is one of the areas of investigation in Soviet-French cooperation. Investigations began with the Calypso experiment carried on board the Prognoz 2 satellite, which was boosted into an orbit with an apogee of 200,000 kilometers, and the Gemeaux-T experiment carried by the Mar 6 and Mars 7 probes. Soviet and French scientists obtained valuable information on the solar wind, plasma fluxes in the transition layer, propagation of interplanetary shock waves, their relationship with solar flares, as well as on correlations between the characteristics of the interplanetary medium, the Sun and magnetospheric phenomena.

In addition, physical processes taking place in the Earth's magnetosphere and ionosphere, particularly fluxes of electrons and protons of various energies in the region of high latitudes, were investigated using French Arcade scientific instrumentation carried on Soviet satellites of the Oreol series.

The Sambo experiment was conducted in lower-altitude orbits, in the Earth-adjacent layer. Its purpose was to draw up recommendations on ensuring more reliable radio communications during aurora borealis. Soviet, French and Swedish instrumentation carried by drifting balloons was used for the joint investigations. Specialists were attempting to gain a more complete picture of the physical processes taking place in near-Earth space during periods of injection of large numbers of charged particles (electrons and protons) into the ionosphere from space at polar latitudes, causing the aurora borealis, disrupting radio communications, and disturbing electric and magnetic fields.

The research program consists of several stages. The first was completed in January-March 1974, while the second was completed at the beginning of 1979. The balloons were released from the Swedish research facility at Kiruna. Prevailing westerly winds caused them to drift eastward (at an altitude of 30-40 km) over the territory of Sweden, Finland, and the USSR. They traveled (as far as the Northern Urals) up to 2,000 km, at a drift speed of 300 km/h. The scientific instrumentation package weighed approximately 100 kg. The Sambo experiments also make it possible to investigate X-ray electron bremsstrahlung, fluctuation in electrical field, and glow in the upper atmosphere.

In November 1970 and January 1973 the Lunokhod 1 and Lunokhod 2 vehicles were placed on the surface of the moon, carrying French-made laser corner reflectors. Detection and ranging sessions with Lunokhod 1 were conducted on the very first Lunar night (after landing on the Moon), with the aid of lasers coaxially-mounted with telescopes at astrophysical observatories located in the Crimea and at Pic du Midi (France). Distance to the Moon was determined with an error of plus or minus 3 meters.

Joint investigations of Mars with the aid of Soviet unmanned probes commenced in 1973, and of Venus in 1975. Experiments made it possible to determine the temperature of the Martian upper atmosphere, the distribution of concentration of atomic hydrogen by altitude in the planet's vicinity, and to determine the amount of hydrogen and deuterium in the Venusian atmosphere. Launching of the Vega 1 and Vega 2 probes in December 1984 constituted a further stage in joint



combined scientific investigations in the atmosphere and on the surface of Venus.

In the area of satellite communications, a number of experimental color TV transmissions were made between Moscow and Paris, via the Soviet Molniya 1 and Molniya 2 satellites as well as the French-West German Symphonie communications satellite. In particular, in 1975 TV programming was transmitted from Moscow via the latter satellite for the Paris International Aerospace Show.

As regards space biology and medicine, cooperation between the USSR and France encompasses such areas as radiobiology, immunology, and physiology. Bioblok-1, the first radiobiology experiment, was conducted in November 1975 by the Kosmos 782 satellite. This experiment included study of the effect of cosmic radiation on biological subjects. An immunology experiment, Ulysse, aimed at studying change in the immunologic potential of animals (rats and rabbits), was performed on the Kosmos 936 satellite. Joint research on cell biology was conducted in the Cytos experiment on board the Salyut 6 orbital station in 1978 and 1980. Its purpose was to study the effect of space flight factors on cell fission.

Valuable data in the fields of biology and medicine, astrophysics and technology were obtained as a result of experiments conducted by Soviet and French cosmonauts on board the Salyut 7 orbital station.

Work is currently in progress on a number of large-scale projects. A Gamma and Sigma astrophysical research project satellite, for example, is scheduled for launch in 1987. Two Phobos project unmanned vehicles are scheduled to be launched in 1988. French-built scientific instruments will be used to analyze Phobosian soil, to obtain images of the Martian satellite's surface, and to study the Martian atmosphere and solar activity.

In addition, a formal agreement has been reached which calls for Soviet-French scientific and technical experiments in the fields of space physics, technology, medicine, biology, meteorology, and communications to be conducted in 1986-1990 on Soviet unmanned vehicles and orbital station.

Cooperation between the USSR and France in the area of space research is a striking example of uniting countries' intellectual, technical and economic efforts in the cause of peaceful exploitation of space and the employment of space technology to meet the social and economic needs of peoples.

"It is a source of great satisfaction to us that both the USSR and France hold the position that space should be an arena not of military confrontation but of peaceful cooperation," noted Comrade M. S. Gorbachev, speaking in Paris. "Our two countries have conducted more than 40 joint experiments involving the peaceful investigation of near-Earth space, and now Venus and Comet Halley as well. Specialists in both countries are proposing that the mutual cooperation be expanded. I believe that political authorities will support this proposal."

This is dictated by the interests of the two countries and is in conformity with tasks of expanding international cooperation in the name of peace in space and on Earth.

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